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Response Action Contract IX

FIELD SAMPLING PLAN
FOR OMEGA CHEMICAL SUPERFUND SITE OPERABLE UNIT 1
REMEDIAL INVESTIGATION/
FEASIBILITY STUDY OVERSIGHT

MONTEBELLO FOREBAY
LOS ANGELES COUNTY, CALIFORNIA

U.S. Environmental Protection Agency
Contract No. 68-W-98-225

CH2M HILL, Inc.
and Team Subcontractors:
URS Greiner Woodward Clyde Federal Services, Inc.
E2 Consulting Engineers, Inc.

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EPA Contract No. 68-W-98-225
EPA Work Assignment No. 174-RBSD-09BC
CH2M HILL PROJECT NO. 183120

Prepared for
U.S. Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, California 94105

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January 2004

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CH2MHILL

January 28, 2004

183120

Christopher Lichens
U.S. EPA Region IX
Superfund Project Manager
75 Hawthorne Street
San Francisco, CA 94105

Subject: Final FSP and QAPP for Omega Chemical Superfund Site Remedial Investigation/Feasibility Study Oversight

Dear Mr. Lichens:

Please find enclosed two copies of the subject documents.

Please contact me at 909/890-9857 if you have questions regarding the enclosed documents.

Sincerely,

CH2M HILL

Tom Perina
Site Manager

Enclosures
c: David Taylor, U.S. EPA Region IX Quality Assurance Manager

E102003016SCO/bs1065.doc/032940024

FIELD SAMPLING PLAN
FOR OMEGA CHEMICAL SUPERFUND SITE OPERABLE UNIT 1
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FEASIBILITY STUDY OVERSIGHT

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75 Hawthorne Street
San Francisco, California 94105
CH2M HILL PROJECT NO. 183120.PP.02

January 2004

NONDISCLOSURE STATEMENT

U.S. ENVIRONMENTAL PROTECTION AGENCY REGION IX

Plan Title:	Draft Field Sampling Plan for Omega Chemical Superfund Site Operable Unit 01 Remedial Investigation/Feasibility Study Oversight
Site Name:	Omega Chemical Superfund Site
Site Location:	Whittier
City/State/Zip:	Los Angeles County, California
Site EPA ID#:	09BC
Anticipated Sampling Dates:	2004
Prepared By:	Tom Perina — January 2004 (Date)
Agency or Firm:	CH2M HILL, Inc.
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EPA Work Assignment Manager:	Christopher Lichens Section: SFD-7-4
Telephone:	415/972-3149
FSP Approval Date:	

* *

Approved: Tom Perina, Ph.D., R.G., C.H.G. Tom Perina Date: January 2004
CH2M HILL Site Manager

Approved: Artemis Antipas, Ph.D. Artemis Antipas Date: January 2004
CH2M HILL Quality Assurance Officer

Approved: Christopher Lichens Date: ________
EPA Work Assignment Manager

Approved: ________ Date: ________
EPA Quality Assurance Officer

* *

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Acronyms

ASTM	American Society for Testing and Materials
bgs	below ground surface
°C	degrees Celsius
CDM	Camp Dresser & McKee
CDWR	California Division of Water Resources
cis-1,2-DCE	cis-1-2-dichloroethene
CLP	contract laboratory program
CPT	Cone Penetrometer Test
COC	chain-of-custody
DQO	data quality objective
EE/CA	engineering evaluation/corrective action
EPA	Environmental Protection Agency
Freon 11	trichlorofluoromethane
Freon 113	trichlorotrifluoromethane
ft./ft.	feet per foot
FB	field blank
FSP	field sampling plan
HCl	hydrochloric acid
HPLC	high pressure liquid chromatography
ID	identification
µm/L	micrograms per liter
MCL	maximum contaminant limit
mg/L	milligrams per liter
mL	milliliters
MS	matrix spike
MSD	matrix spike duplicate
msl	mean sea level
OPOG	Omega Chemical Site PRP Organized Group

OU	operable unit
PCB	polychlorinated biphenol
PCE	perchloroethylene (tetrachloroethene)
PRG	Preliminary Remediation Goals
PRP	potentially responsible party
QAPP	Quality Assurance Project Plan
QAO	Quality Assurance Office
QC	quality control
RSCC	Region 9 Sample Coordination Center
RCRA	Resource Conservation and Recovery Act of 1978
RFA	request for analyses
RI/FS	remedial investigation/feasibility study
SVOC	semivolatile organic compounds
TCE	trichloroethylene
TDS	total dissolved solids
TOC	total organic carbon
VOA	volatile organic analysis
VOC	volatile organic compound
Weston	Weston Solutions, Inc.
1,1-DCA	1,1-dichloroethane
1,2-DCA	1,1-dichloroethane
1,1-DCE	1,1-dichloroethene
1,2-DCE	1,2-dichloroethene
1,1,1-TCA	1,1,1-trichloroethane
trans-1,2-DCE	trans-1,2-dichloroethene

Section 1
Objectives

This Field Sampling Plan (FSP) has been prepared to support the U.S. Environmental Protection Agency's (EPA) oversight of field sampling and analysis conducted by the Potentially Responsible Parties (PRPs) as part of the remedial investigation/feasibility study (RI/FS) for the Omega Chemical Superfund Site Operable Unit 1 (OU-1). The field activities regarding EPA oversight (i.e., including split sampling) include surface soil, soil gas, ambient air, indoor air, and groundwater sampling within the OU-1 area. No subsurface split samples will be collected by CH2M HILL. This FSP was developed in accordance with EPA Region IX, Guidance for Preparation of a U.S. EPA Region IX, Field Sampling Plan for EPA-Lead Superfund Projects (EPA, 1993).

1.1 Background

The Omega Chemical Corporation (the Site) is a former refrigerant/solvent recycling operation located in Whittier, California, a community of approximately 85,000 people (Figure 1-1). The facility is located across the street from a residential neighborhood and within 1 mile of several schools, including three elementary schools and two high schools. The facility operated as a Resource Conservation and Recovery Act (RCRA) solvent and refrigerant recycling and treatment facility from approximately 1976 to 1991, handling primarily chlorinated hydrocarbons and chlorofluorocarbons. Drums and bulk loads of waste solvents and chemicals from various industrial activities were processed at the Site to form commercial products. Chemical, thermal and physical treatment processes were reportedly used to recycle the waste materials. Wastes generated from these treatment and recycling activities included still bottoms, aqueous fractions, and non-recoverable solvents. Additional data regarding site history and past investigations and remediation activities are discussed in detail in Camp Dresser & McKee's (CDM) OSS RI/FS Work Plan (2003) and Weston Solutions, Inc. (Weston) June 2002 Phase 2 Groundwater Characterization Study Report.

Data obtained in 1988 from site assessment activities, including groundwater and soil sampling conducted by the site owner/operator, Dennis O'Meara, and data from a preliminary assessment conducted by EPA in January 1995, indicated the presence of hazardous substances in subsurface soil and groundwater at the Site, including methylene chloride, tetrachloroethylene, and trichloroethylene. The presence of these substances and deteriorated underground storage tanks at the Site lead EPA to determine that an imminent and substantial endangerment requiring a removal action existed at the Site.

On May 3, 1995, EPA issued an Action Memorandum authorizing a Removal Action involving the following response actions:

- Securing the Site
- Sampling and categorizing hazardous materials

- Removing hazardous substances and grossly contaminated equipment, structures, and debris
- Sampling surface and subsurface soils and groundwater to determine the nature and extent of contamination
- Disposing, stabilizing or treating grossly contaminated soils
- Grading, capping, and fencing contaminated soil areas

EPA has divided the Omega Chemical Superfund Site into two Operable Units: OU-1 and OU-2. OU-1 includes the Omega Chemical Facility property and extends a short distance west-southwest to Putnam Street (Weston, 2003). OU-2 surrounds the Omega Chemical Facility and extends off-site approximately 2.2 miles to the southwest. This FSP describes oversight work to be completed within OU-1.

As part of the OU1 effort, EPA entered into a Partial Consent Decree with the PRPs who had agreed to complete work at the site. This group is known as OPOG (Omega Chemical Site PRP Organized Group). This Partial Consent Decree was entered into the District Court on February 23, 2001. OPOG agreed to perform the following work at the Site:

- Implement an RI/FS for contamination in the vadose zone within what is known as the "Phase 1A area" of the Site (described below);
- Conduct a Non-Time Critical Removal Action (expected to be a groundwater containment system [pump and treat] along the downgradient edge of the Phase 1A area). The Removal Action will involve the following:
  - Preparing an Engineering Evaluation/Cost Analysis (EE/CA) to address groundwater contamination in the Phase 1A area;
  - Preparing an Action Memorandum describing the selected action; and
  - Following public comment, implement the Removal Action.
- Performing a risk assessment for potential contamination resulting from releases of hazardous substances from the Site within the Phase 1A area; and
- Installing up to three groundwater monitoring wells at locations downgradient of the Phase 1A area and upgradient of the City of Santa Fe Springs water supply well 30R3.

1.2 Objectives

The objective of this FSP is to provide field oversight, including split sampling, on behalf of EPA for the field work conducted by OPOG's consultant, CDM. As stated in OPOG's Work Plan (CDM, 2003), the objective of the field investigation is to collect data needed to fulfill the following Work Plan goals:

- Characterize nature and extent of soil contamination at the Site;
- Assess the threat these contaminants pose to human health and the environment;
- Evaluate remedial action alternatives
- Eliminate, reduce, or control risks to human health and the environment at the Site.

OPOG will also conduct additional subsurface investigation (CDM, 2003b) to further characterize the subsurface contaminant distribution and soil and aquifer properties.

The objectives of the EPA oversight are:

- Ensure that OPOG's field activities are completed in accordance with the EPA-approved Work Plan (CDM, 2003);
- Collect and analyze split samples to verify OPOG's sampling results; and
- Ensure that OPOG's Work Plan goals are met.

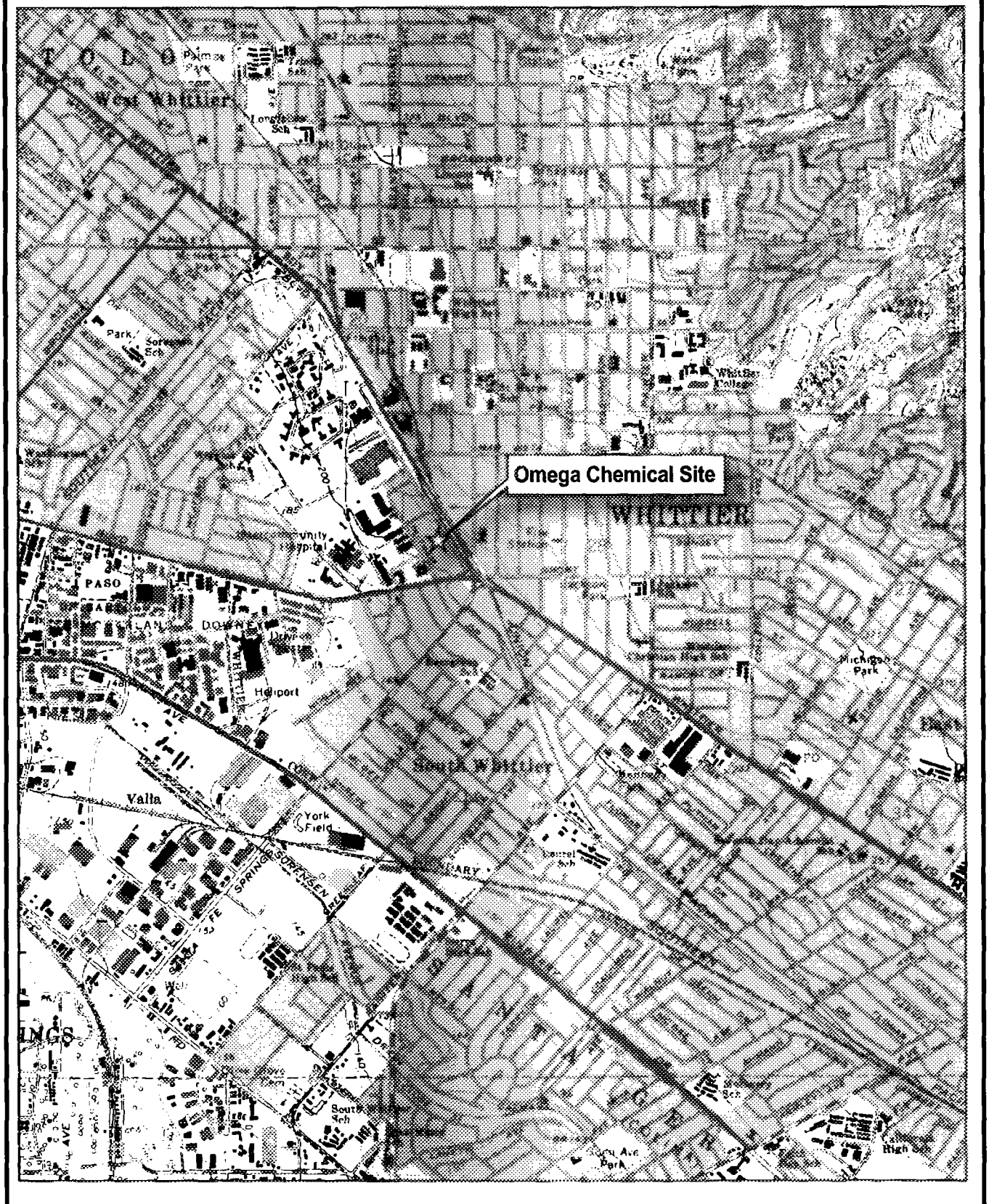

Figure 1-1
Site Location Map
Omega Chemical Superfund Site
Whittier, California

Source: U.S.G.S. 7-1/2 Minute Quadrangle Map, Whittier, CA., 1981

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Section 2
Site Background

2.1 Location and Topography

The Omega Chemical Facility is located at 12504 and 12512 East Whittier Boulevard in Whittier, California (Figure 1-1). The City of Santa Fe Springs is located southwest of the Site. The community of Los Nietos is included within the City of Santa Fe Springs. Unincorporated County of Los Angeles land is located northwest of the site.

The Omega Chemical Facility is located along the base of the La Habra piedmont slope descending from the southwestern flank of the Puente Hills, at an elevation of approximately 220 feet above mean sea level (msl) (Weston, 2003). "The piedmont slope descends toward the southwest at approximately 2.5 percent to a point approximately 2,800 feet southwest of the Omega Chemical Facility. At this point, the ground surface flattens into a broad basin or plain, at an elevation of approximately 150 to 155 feet msl. In the southwestern part of the study area, the ground surface ascends a low rise at the northwest end of the Santa Fe Springs plain, at an approximate elevation of 160 feet msl (Weston, 2003)." The site and surrounding areas are completely developed. The Sorenson Avenue drain is a small channelized drainage that flows southeast from the intersection of Dice Road and Slauson Avenue and becomes La Canada Verde Creek to the south of the OU-2 study area (Weston, 2003). La Canada Verde Creek cuts a low gap between the Coyote Hills on the east and the Santa Fe Springs Plain on the west (Weston, 2003).

2.2 EPA Activities in the OU-1 Area

CDM, acting as OPOG's consultant, is conducting a RI/FS for OU-1. EPA is acting as the lead oversight agency, and CH2M HILL is providing field oversight on behalf of EPA. Specific field activities are described in Section 3.

2.3 Hydrogeology

This section summarizes the site regional hydrogeological setting and site-specific hydrogeologic conditions.

2.3.1 Regional Hydrogeology

The following information on regional hydrogeological setting is largely based on the California Division of Water Resources (CDWR) Bulletin 104 (1961).

The site is located in the Central Basin of the Coastal Plain of Los Angeles County. The Coastal Plain is bounded on the west and south by the Pacific Ocean and by mountains on the north, east, and southeast. The Coastal Plain is underlain by an extensive groundwater basin in Los Angeles and Orange Counties.

Water-bearing sediments identified in the Whittier area extend to an approximate depth of at least 1,000 feet below the ground surface (bgs). The identified geologic units consist of Recent alluvium, the upper Pleistocene Lakewood Formation and the lower Pleistocene San Pedro Formation. Figure 2-1 shows a generalized stratigraphic column of water-bearing sediments in the Whittier area.

As reported by CDWR (1961) the uppermost unit in the vicinity of the Omega site consists of the "Bellflower Aquiclude." The Bellflower Aquiclude comprises all the fine-grained sediments that extend from the ground surface down to the first aquifer (Figure 2-1). The Bellflower Aquiclude consists primarily of clay and sandy clay to silt, and ranges from 20 to more than 40 feet in thickness in this area. CDWR (1961) considers the Bellflower Aquiclude to be present in both the recent alluvium and the upper part of the Lakewood Formation (Figure 2-1). In the Whittier area, the Bellflower Aquiclude is considered to be entirely within the Lakewood Formation. Water-bearing zones locally occurring within the Bellflower Aquiclude are referred to collectively and informally as the Semiperched Aquifer.

The Lakewood Formation consists of non-marine deposits of Late Pleistocene age and attains a maximum thickness of 70 feet. The Gage Aquifer is the major water-bearing member and comprises the basal lithologic unit of the Lakewood Formation (Figure 2-1). It consists of about 30 feet of sand with some interbedded clay. Based on previous investigation at the Omega site, the Gage Aquifer appears to be absent beneath the site proper. A sand interval found in exploratory borings a short distance southwest of the site is believed to correlate with the Gage Aquifer (England and Hargis, 1996). The Gage aquifer is interpreted by CDWR (1961) to extend eastward approximately 2.5 miles south of the site. However, exploratory borings suggest the Gage is present west of the Omega site; but pinches out or disappears towards the east. The Gage aquifer does not appear to be an important source of drinking water in the Whittier area, based on elevated total dissolved solids (TDS) concentrations observed during sampling, and none of the local water supply wells produce water from this aquifer.

Underlying the Lakewood Formation are primarily marine sand and gravels with interbedded clay, assigned to the San Pedro Formation. The San Pedro Formation reaches a maximum thickness of 850 feet and extends to a depth of about 920 feet. The San Pedro Formation unconformably underlies the Lakewood Formation. The San Pedro Formation has been subdivided into five named aquifers separated by clay members. A fine-grained layer is also typically present at the top of the sequence, although in localized areas, the uppermost San Pedro Formation aquifer may be merged with the overlying aquifer, and one or more of the five aquifers may also be merged (CDWR, 1961). This suggests that the Gage sand unit could directly overlie and be in hydraulic connection with San Pedro Formation aquifers in the vicinity of the Omega site. Subsurface explorations conducted near the site to date, however, have identified clays underlying the suspected Gage-equivalent sand unit.

The five aquifers defined within the San Pedro Formation include, from top to bottom, the Hollydale, the Jefferson, the Lynwood, the Silverado, and the Sunnyside (Figure 2-1). The upper two aquifers are less extensive and appear to be absent in the immediate vicinity of the Omega site.

The San Pedro aquifers consist of varying amounts of sand and gravel with some interbedded clay. The thickness of the aquifers increase with depth. The shallow Hollydale

aquifer ranges from 10 to 25 feet whereas the deepest Sunnyside Aquifer ranges from 200 to 300 feet. The base of the Sunnyside Aquifer reaches a maximum depth of about 1000 feet bgs (CDWR, 1961). The San Pedro Formation aquifers are the primary source of water for the production wells in the area.

The Pliocene and Miocene sediments below the San Pedro Formation (Figure 2-1) generally contain saline water in the area, but locally contain freshwater (CDWR, 1961).

Based on a record search by England-Hargis (1996), there are 6 water supply wells within 1.5 miles of the site. The nearest well (02S/11W30-R3, also known as Santa Fe Springs Well No. 1) is located 1.3 miles to the west southwest of the former Omega facility. The well is screened at 200 to 288 feet bgs and 300 to 900 feet bgs. Trichloroethylene (TCE) (0.7 micrograms per liter [µg/L]) and chloroform (1.3 µg/L) were detected in water samples collected from the well in October 1994. The Los Nietos water supply well (02S/11W30-Q5) is located about 1.5 miles southwest of the site. This well is screened from 152 to 370 feet bgs. Perchloroethylene (PCE) and TCE were detected at unknown concentrations in 1986-90. The remaining wells are no longer operating, are used for irrigation, or no data were available.

2.3.2 Site Hydrogeology

The hydrogeology of the Omega site has been explored with borings and Cone Penetrometer Testing (CPT). The site is underlain by low permeability silty and clayey soils to a depth of at least 120 feet. No significant water producing sand units have been found directly beneath the site in any of the exploratory borings. A sand unit, which may correlate with the Gage Aquifer, has been encountered approximately 600 feet southwest of the site beneath Putnam Street. Groundwater occurs at approximately 70 feet bgs. Locally, groundwater flow appears to be generally to the southwest. CDM (1999) reported a local direction of groundwater flow towards the southwest with a hydraulic gradient of 0.009 feet per foot (ft/ft). TDS concentrations of greater than 3,000 milligrams per liter (mg/L) were reported in shallowest groundwater samples collected by CDM (1999).

The hydraulic conductivity of the upper silty unit was estimated from step-drawdown tests conducted in monitoring well OW2 and a slug test at well OW1. The hydraulic conductivity in this area was found to range from 0.8 to 1.6 feet per day (CDM, 2003).

2.4 Water Quality

Groundwater at the site has been impacted primarily by chlorinated hydrocarbons and Freon compounds (i.e., volatile organic compounds [VOCs]) . The following summary is based on the results of Phase 2 Groundwater Characterization Study (Weston, 2003).

The five primary chlorinated compounds detected in groundwater are:

- PCE (also known as tetrachloroethene)
- TCE (also known as trichloroethene)
- 1,1-dichloroethene (1,1-DCE)
- Cis-1,2- dichloroethene (cis-1,2-DCE)
- Chloroform

These are the most widespread VOCs detected in groundwater in the vicinity of the Site.

Eight other VOCs were locally detected in groundwater in lower concentrations. These compounds include:

- 1,2-dichloroethane (1,2-DCA)
- 1,1-dichloroethane (1,1-DCA)
- 1,1,1-trichloroethane (1,1,1-TCA)
- Trans-1,2-dichloroethene (trans-1,2-DCE)
- 1,2-dichloropropane
- Vinyl chloride
- Methylene chloride
- Carbon tetrachloride

Freon compounds reportedly detected at the site include:

- Trichlorofluoromethane (also known as Freon 11)
- Trichlorotrifluoromethane (also known as Freon 113)

Groundwater samples collected from monitoring wells at the site were also analyzed for metals, total organic carbon (TOC), total nitrogen, sulfate, sulfide, and methane/ethane/ethene. Elevated total chromium concentrations were detected in groundwater samples collected from monitoring wells at the site (Weston, 2003).

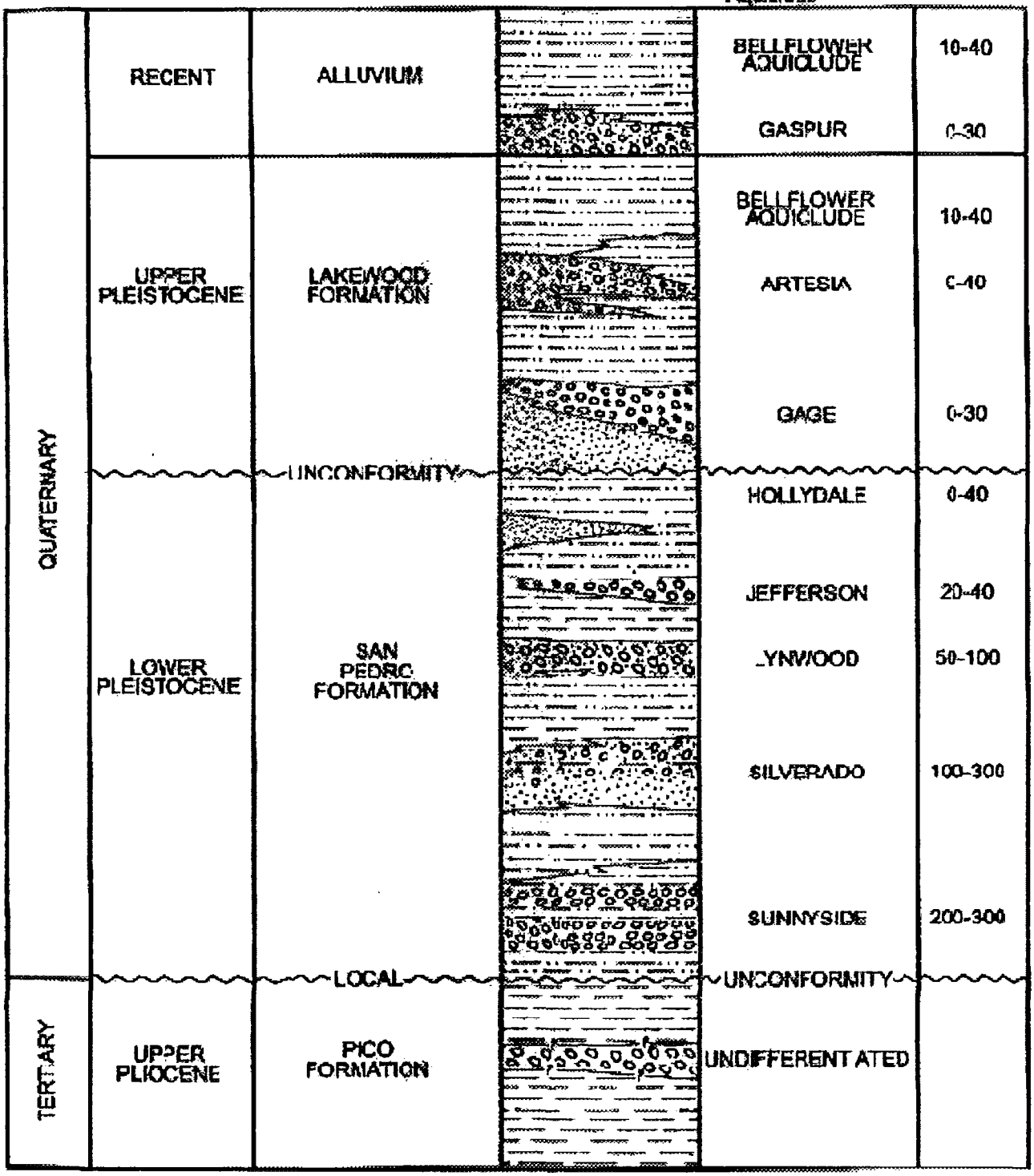

Figure 2-1
Generalized Stratigraphic Column for the Whittier Area (Based on data from CDWR, 1961)
Omega Chemical Superfund Site
Whittier, California

Source: Weston, 2003.

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Section 3
Rationale for Sample Locations, Number of Samples, and Laboratory Analyses

This section presents a description of the split sample collection that CH2M HILL will conduct on behalf of EPA during OPOG field sampling activities at the Omega Chemical Superfund Site OU-1.

A description of the sample locations, the rationale for the sample locations, number of samples, and laboratory analyses to be performed by OPOG is presented in Section 6.0 of OPOG's Work Plan (CDM, 2003a). On-and off-site sampling locations collected by the PRPs and approved by EPA are presented in Figures 3-1 and 3-2, respectively, of this FSP, and groundwater sampling locations are shown in Figure 3-3. OPOG will also conduct additional soil and groundwater sampling (CDM, 2003b).

A description of the number of split samples that will be collected by CH2M HILL and the laboratory analyses to be performed on those samples are described below. The number of samples collected may vary depending upon changes in scope of work. It is assumed that split samples will be collected for 10 percent of the planned OPOG samples. The same or equivalent analytical methods conducted by OPOG will be conducted on split samples.

3.1 Surface Soil Sample Collection

3.1.1 Assessment of Regulatory Requirements

The surface soil samples collected by OPOG will be analyzed to support a screening risk evaluation. The screening risk evaluation will include a comparison of surface soil sample results with EPA Region IX Preliminary Remediation Goals (PRGs).

3.1.2 Sampling Locations

OPOG's surface soil sampling locations are shown in Figure 3-1. Split samples will either be randomly collected or collected based on field observations that indicate the possible presence of contamination.

3.1.3 Number of Samples

It is anticipated that four split surface soil samples will be collected by CH2M HILL, plus quality control (QC) samples in accordance with Section 5.5. This is approximately 20 percent of the OPOG samples; this higher percentage was chosen because of expected high variability of the soil sample analytical results.

3.1.4 Laboratory Analyses

All split surface soil samples will be analyzed for semivolatile organic compounds (SVOCs) using EPA Method 8270C and pesticides and polychlorinated biphenols (PCBs) using EPA Method 8081A/8082. Future sampling may also require analysis for VOCs using EPA Method 5035.

3.2 Subsurface Soil Sample Collection

3.2.1 Assessment of Regulatory Requirements

The subsurface soil samples will be collected and analyzed in support of characterizing the site soil conditions. The planned sample analyses are not driven by regulatory limits. Future site investigation efforts may also include sampling to characterize subsurface contaminant distribution.

3.2.2 Sampling Locations

OPOG's subsurface soil sampling locations are shown in Figure 3-1. Oversight will include observation of OPOG's field activities and review of laboratory results. The planned subsurface analytical results will not be used in any regulatory decisions. The locations of future samples for characterization the contaminant distribution will be subject to regulatory oversight.

3.2.3 Number of Samples

No split subsurface soil samples are expected to be collected by CH2M HILL.

3.2.4 Laboratory Analyses

OPOG's subsurface soil samples will be analyzed for redox potential using EPA Method 2850B, organic carbon content using SW-846 Method 9060 Modified, cation exchange capacity using SW-846 Method 9081, and moisture content using American Society for Testing and Materials (ASTM) Method D2216. Future sampling may also require analysis for VOCs using EPA Method 5035, SVOCs using EPA Method 8270C, and pesticides and polychlorinated biphenols (PCBs) using EPA Method 8081A/8082.

3.3 Soil Gas Duplicate Sample Collection

3.3.1 Assessment of Regulatory Requirements

The objective of the sampling is to establish a lateral boundary of the contaminated soil and provide data to evaluate vapor migration potential for the risk assessment. The risk assessment will evaluate the site based on EPA Region IX PRGs.

3.3.2 Sampling Locations

Soil gas samples will be collected at the former Omega Chemical Site as well as at the former Cal-Air facility. The soil gas sampling locations are shown on Figure 3-1 and Figure 3-2.

3.3.3 Number of Samples

Two duplicate soil gas samples will be collected by CH2M HILL.

3.3.4 Laboratory Analyses

Soil gas samples will be analyzed for VOCs using EPA Method 8260 (TO-14). One matrix spike duplicate MSD sample will also be collected and analyzed for VOCs using EPA Method 8260 (TO-14).

3.4 Indoor and Ambient Air Duplicate Sample Collection

3.4.1 Assessment of Regulatory Requirements

The objective of the sampling is to establish background contaminant concentrations for the risk assessment. The risk assessment will evaluate the site based on EPA Region IX PRGs.

3.4.2 Sampling Locations

OPOG's indoor air sampling locations will be selected to be distant from areas used for storage of paints, cleaning products, or other potential sources of chemicals to indoor air. EPA will provide input to CDM on the selection of appropriate indoor air sampling locations. OPOG will collect two ambient air samples from the Site. Samples will also be collected from two locations upwind of the Site. CDM will use a wind sock to evaluate wind direction and sample locations will be selected following evaluation of site-specific meteorology. Split samples will either be randomly collected or collected based on field observations that indicate the possible presence of contamination. Ambient and indoor air samples are not shown on a figure.

3.4.3 Number of Samples

It is anticipated that two split air samples will be collected by CH2M HILL, plus QC samples in accordance with Section 5.5. This is approximately 10 percent of the OPOG samples.

3.4.4 Laboratory Analyses

Air samples will be analyzed for VOCs using EPA Method 8260 (TO-14). One MS (matrix spike)/MSD sample will also be analyzed for VOCs using EPA Method 8260 (TO-14).

3.5 Groundwater Duplicate Sample Collection

3.5.1 Assessment of Regulatory Requirements

The groundwater sampling and analysis will be conducted partially in support of the screening risk assessment. The risk assessment will evaluate the site based on the State of California maximum contaminate limits (MCLs).

3.5.2 Sampling Locations

Groundwater sampling locations are shown in Figure 3-3.

3.5.3 Number of Samples

Twelve duplicate groundwater samples will be collected by CH2M HILL from monitoring wells located at the former Omega Chemical Company property as well as from monitoring wells located offsite from the former Omega Chemical Company. Three duplicate groundwater samples will be collected during each round of semi-annual sampling. One duplicate sample will always be collected from the most contaminated well, OW-1. The other two duplicate samples will be collected randomly from other site wells.

3.5.4 Laboratory Analyses

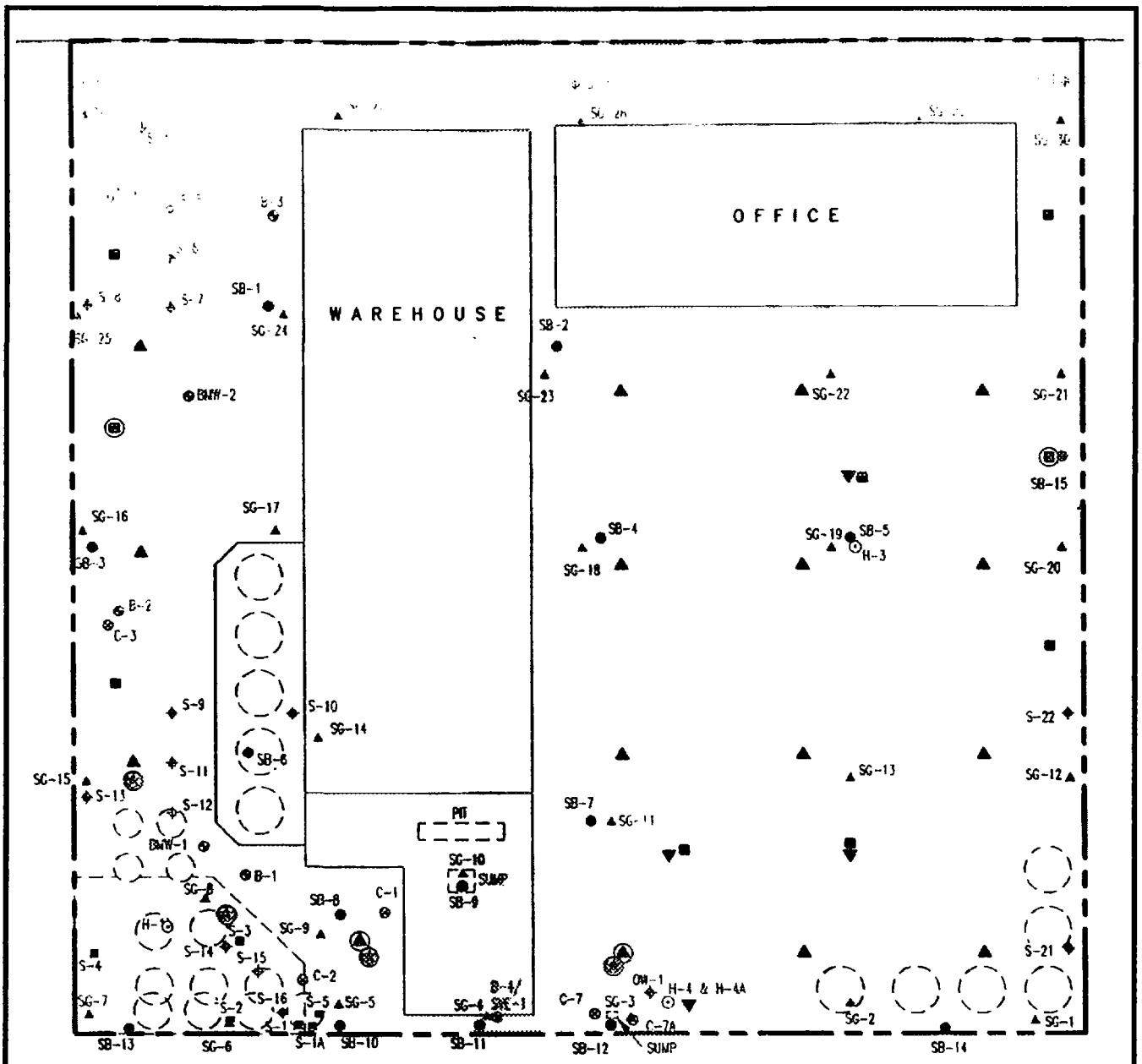
Groundwater samples will be analyzed for VOCs using EPA Method 8260. MS/MSD samples will also be analyzed for VOCs using EPA Method 8260.

3.6 Sample Labeling

Each collected sample and QC sample, including equipment rinsate blanks, will be clearly labeled with a label covered with clear adhesive tape. An example sample identification and explanation follows:

OC-OU1-10

OC will be used as a sample ID prefix on all samples to denote that the sample was collected as part of the Omega Chemical investigation. OU1 or OU2 will follow the prefix to denote which operable unit (OU1 or OU2) the sample was collected from; this sampling effort is conducted entirely for OU1. OU1 will then be followed by a sequential number denoting the order in which the sample was collected.



LEGEND

- ■ Leroy Crandall Soil Boring (1985)
- ○ ENSR Soil Boring (1988)
- ⊛ ENSR Groundwater Monitoring Well (1988)
- ● England/Hargis Soil Boring (January 1996)
- ▲ England/Hargis Soil Gas Sample (December 1995)
- ✦ England/Hargis Monitoring Well (June 1996)
- ⊙ England/Hargis Hydropunch (March 1996)
- ⊗ England/Hargis Soil Boring (March 1996)
- ✦ ERT Soil Gas Sample (1988)
- ◌ Feature Removed
- ▲ Systematic Surface Soil Sample
- ▼ Purposive Surface Soil Sample
- ■ Soil Gas Sample
- ⊛ Deep Soil Boring

NOTE

Samples to be analyzed for physical characteristics are designated by a black circle around the symbol.

1" = 30'

15 0 30

Note: All locations approximate. Features based on Oct. 28, 1984 aerial photo and Figure 1 of England/Hargis Phase II Close Out Report

Figure 3-1
On-Site Sample Location Map
Omega Chemical Superfund Site
Whittier, California

Source: CDM, 2003.

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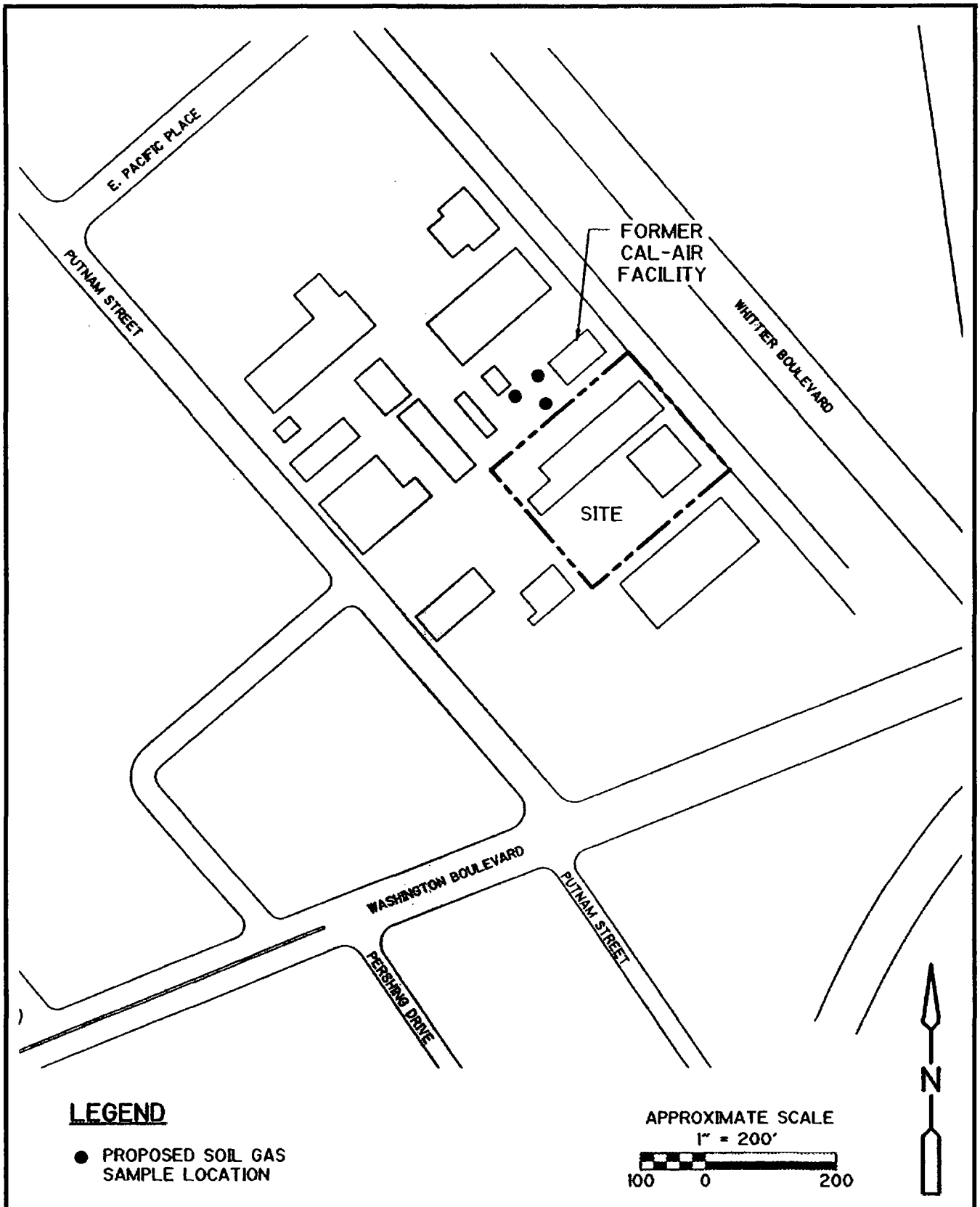
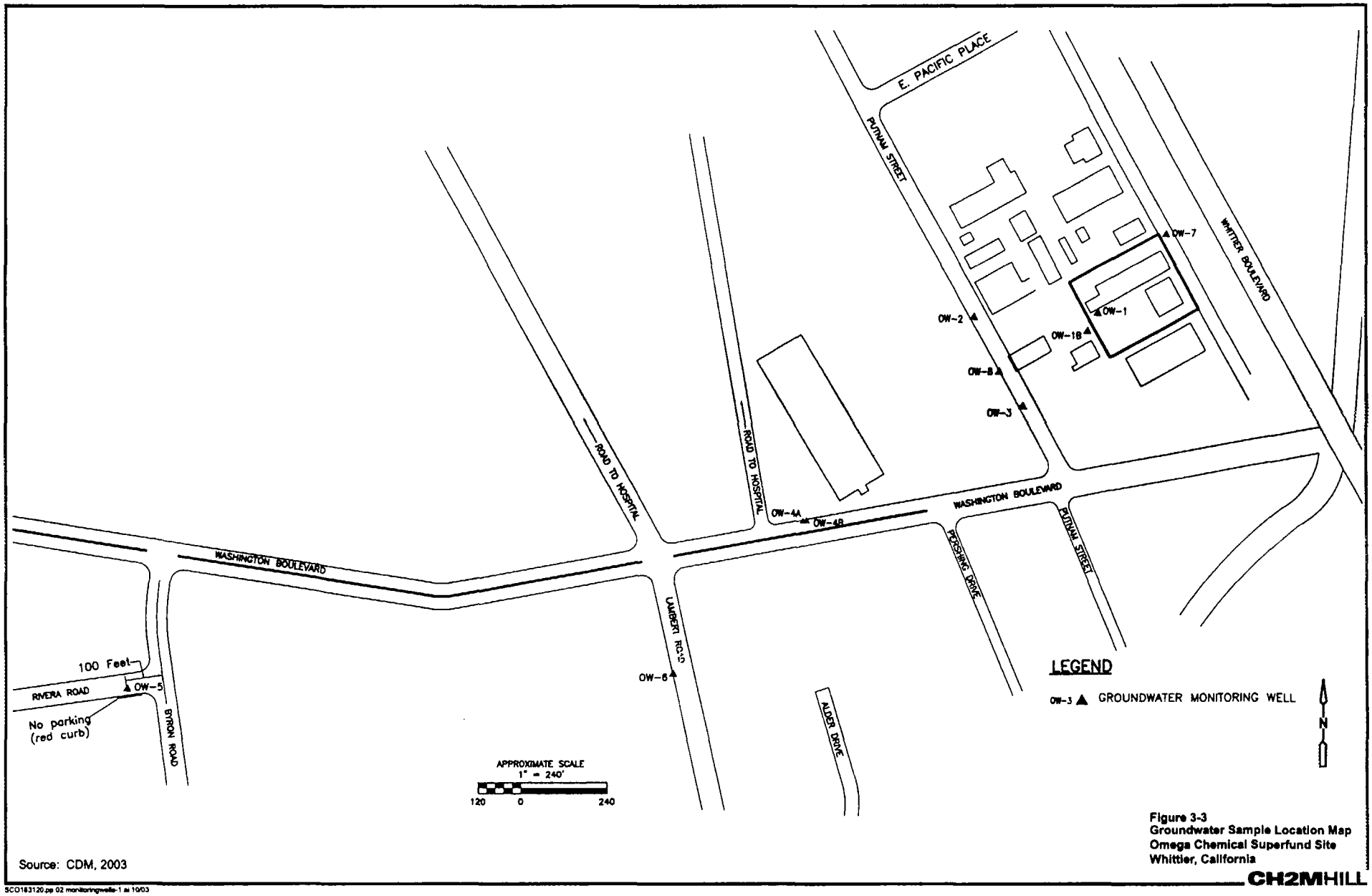


Figure 3-2
Off-Site Sample Location Map
Omega Chemical Superfund Site
Whittier, California

Source: CDM, 2003

CH2MHILL

E102003007SCO183120.PP.02 samplocs-1.ai 10/03



Source: CDM, 2003

Figure 3-3
Groundwater Sample Location Map
Omega Chemical Superfund Site
Whittier, California

CH2MHILL

SCO163120.pp 02 monitoringwells-1 ai 10/03

Section 4
Request for Analyses

This section presents the request for analyses (RFA) and anticipated sampling schedule.

4.1 Analytical Parameters

Table 4-1 summarizes the analytical parameters, and test methods for the samples that will be collected and submitted during the OU-1 soil, air, and groundwater sampling events. The table indicates the sample preservation requirements, analytical holding times, and sample container requirements. Target compound lists and reporting limits for all samples to be collected during this project [as designated by CDM (2003) and approved by EPA] are included in Appendix A.

4.2 Schedule

Scheduling of soil, soil gas, air, and groundwater sampling events will be coordinated with OPOG and their contractor (CDM). It is anticipated that the sampling activities will start in January 2004.

Ongoing groundwater sampling events will be conducted on a semi-annual basis to evaluate changes in the extent of the VOC plume. The ongoing sampling schedule will be coordinated with OPOG and CDM.

Table 4-1
Request for Analyses
Omega Chemical Superfund Site OU-1 Split Sampling

	Organics				Inorganics (OPOG Sampling)			
Method	8260 (TO-14) [1]	8260	8081A/8082	8270C	SM 2580B	SW-846 9060	SW-846 9081	ASTM D2216
Specific Analyses Requested	VOCs - soil gas and air	VOCs - groundwater	Pesticides and PCBs-surface soil	SVOCs - surface soil	Redox Potential	Organic Carbon Content	Cation Exchange Capacity	Moisture Content
Preservatives	none	HCl to pH <2; chill to 4° C; no headspace	Chill to 4° C	Chill to 4° C	Chill to 4° C	Chill to 4° C	Chill to 4° C	Chill to 4° C
Holding Time	14 days	14 days	14 days	14 days	ASAP	28 days	7 days until drying, 8 months after drying	none
	# containers/ analysis				# bottles/ analysis			
Sample Type	1-Summa canister	(3x40 ml glass vial)	6-inch brass sleeve	6-inch brass sleeve	1-8 oz glass jar	1-8 oz glass jar	1-8 oz glass jar	1-8 oz glass jar
surface soil			2	2				
subsurface soil								
soil gas	2							
air	2							
groundwater		12						
Total Samples	4	12	2	2				
Total Duplicates								
Total Field/Equipment Blanks								
Total Trip Blanks								
Total Laboratory QC (MS/MSD) Samples	2	6	1	1				
Total Analyses	6	18	3	3				

Notes

[1] Soil gas samples will be analyzed by a Contract Laboratory Program (CLP).
Lab QC = Matrix spike/matrix spike duplicate sample set which will be twice the normal sample volume

Section 5
Field Methods and Procedures

This section of the FSP provides information on field activities associated with the split sampling at the Omega Chemical Superfund OU-1 RI/FS. Included in this section are methods and procedures for the following:

- Split sample collection
- Sample containers and preservatives
- Sample management and documentation
- Quality control samples

5.1 Sample Collection

Split surface soil, subsurface soil, soil gas, ambient air, indoor air, and groundwater samples will be collected during the field activities at the Omega Chemical Superfund OU-1 Site. Sample collection procedures are described in detail in Section 6 of OPOG's Work Plan (CDM, 2003). CH2M HILL will collect samples using laboratory-supplied sample containers. All hand augering, drilling, pumping, and other sample collection related activities and equipment will be conducted and supplied by CDM. All sampling equipment will be decontaminated by CDM between sample locations. A brief summary of OPOG's sampling techniques (CDM, 2003) is provided below.

5.1.1 Surface Soil Samples

CH2M HILL will receive split soil samples collected by CDM. The samples will be collected in 6-inch long stainless steel sleeves using a hand auger and slide hammer. CDM staff will operate the sampling equipment. The sleeves will be sealed on each end using Teflon® sheets and plastic end caps.

5.1.2 Subsurface Soil Samples

Following the completion of concrete coring, subsurface soil samples will be collected by CDM using direct-push drilling techniques. Subsurface soil samples will be collected in 3-foot long sleeves.

5.1.3 Soil Gas Summa Canister Samples

Soil gas samples will be collected by CDM using direct-push drilling techniques and a Simulprobe sampler (or approved equal). Soil gas samples will be collected in laboratory-supplied pre-cleaned and evacuated Summa canisters.

5.1.4 Ambient and Indoor Air Summa Canister Samples

Split indoor and ambient air samples will be collected using the same type of sampling equipment used by CDM. The sampling devices will consist of 6-liter stainless steel Summa

canisters that have a critical orifice air flow controller attached to each canister that meters flow over an 8-hour period (CDM, 2003).

5.1.5 Groundwater Samples

CH2M HILL will use laboratory-supplied 40-milliliter (mL) volatile organic analysis (VOA) vials and collect groundwater samples from the outlet used by CDM immediately after CDM has completed their sample collection. Groundwater field parameters will be monitored by CDM personnel. CH2M HILL will record split groundwater parameters from CDM's equipment during well purging prior to sample collection.

5.2 Sample Containers and Preservatives

Sample container requirements and preservation methods for each analysis are summarized in Table 4-1. Sample containers will be laboratory-provided or purchased with certificates of cleanliness from approved laboratory product suppliers. A summary of the sample containers and holding times is provided below. CH2M HILL will provide the sample containers for all media sampled. The split samples will be collected from OPOG's samples or using OPOG's sampling equipment.

5.2.1 Surface Soil Samples

Surface soil samples to be analyzed for SVOCs and pesticides/PCBs will be collected in 6-inch long brass sleeves by CDM and cooled to 4 degrees Celsius (°C). The maximum holding time for SVOCs and pesticides/PCBs will be 14 days for extraction and 40 days for analysis of the extract. Samples for VOC analysis will be collected using Encore samplers by CH2M HILL and frozen using dry ice. The maximum holding time for VOCs is 14 days.

5.2.2 Subsurface Soil Samples

Subsurface soil samples to be analyzed for redox potential, carbon content, cation exchange capacity, and moisture content will be collected by CDM in 8-ounce glass jars. The samples to be analyzed for redox potential will be analyzed immediately. The maximum holding time for carbon content analysis will be 28 days. No holding time is specified for moisture content analysis. Cation exchange capacity analysis will have a holding time of 7 days until drying and 8 months after drying (CDM, 2003).

Surface soil samples to be analyzed for SVOCs will be collected in 6-inch long brass sleeves by CDM and cooled to 4 degrees Celsius (°C). The maximum holding time for SVOCs will be 14 days for extraction and 40 days for analysis of the extract. Samples for VOC analysis will be collected using Encore samplers by CH2M HILL and frozen using dry ice. The maximum holding time for VOCs is 14 days.

5.2.3 Soil Gas Samples

Soil gas samples to be analyzed for VOCs will be collected in Summa canisters by CH2M HILL from OPOG's sampling equipment. The maximum holding time for VOC analysis will be 14 days.

5.2.4 Ambient and Indoor Air Samples

Ambient air samples to be analyzed for VOCs will be collected in Summa canisters by CH2M HILL from OPOG's sampling equipment. The maximum holding time for VOC analysis will be 14 days.

5.2.5 Groundwater Samples

Samples to be analyzed for VOCs will be collected by CH2M HILL from OPOG's sampling equipment in three 40-mL glass VOA vials. A sufficient amount of 1:1 hydrochloric acid (HCl) will be placed inside the vials to lower the sample pH to less than 2.

Samples will be tested to ensure sufficient preservatives have been added (e.g., a test bottle or vial). The test bottles will be filled and checked to determine if sufficient preservatives have been added using the following (or similar) steps:

- Add preservative to test sample vial
- Fill with sample, cap, and invert to ensure mixing
- Test the pH to determine if greater than 2 is achieved; if so, add same amount of preservative to the actual sample vial and collect the sample; discard the test vial
- Add more preservative and repeat until pH greater than 2 is achieved

Many laboratories provide pre-acidified VOA-sample vials and these will be used, if available from the laboratory. A field check of the amount of preservative contained in the pre-acidified VOA vials will be conducted similar to the approach described above, in order to confirm that sufficient preservative has been provided. If the pre-acidified VOA vials do not contain enough preservative to achieve the proper pH (greater than 2), additional preservative will be added to the vial and repeated until the proper pH is achieved. This additional amount of preservative will then be added to each sample container prior to collection of samples.

The vials will be filled so that no headspace is present after sample collection. Filled containers will be checked by inverting the vial and tapping to reveal any air bubbles. If air bubbles are present, containers will be emptied, re-acidified, and refilled. If, after several attempts at sample collection, air bubbles remain, the sample will be described in the field notebook as an "aerated sample." VOA vials will be cooled to 4°C and stored away from sunlight prior to shipping by immediately placing the full sample bottle into an iced cooler. The maximum analytical and contract holding times for VOCs will be 14 days.

5.3 Decontamination

Field equipment used during sampling activities will be decontaminated by CDM using procedures outlined in Section 6 of OPOG's Work Plan (CDM, 2003).

5.4 Sample Management Procedures and Documentation

The following section discusses various sample management procedures that will be followed during the performance of field activities. Included in these sections are procedures for sample packaging and transportation, sample labeling and sample documentation.

5.4.1 Sample Packaging and Shipment

The sample packaging and shipment procedures are outlined below.

5.4.1.1 Preparation of Sample Coolers

The following steps will be used to prepare the sample coolers:

1. Remove all previous labels used on the cooler.
2. Seal all drain plugs with tape (inside and outside).
3. Place a cushioning layer of recyclable cornstarch popcorn or bubble wrap at the bottom of the cooler.
4. Line the cooler with a large plastic bag to contain samples.
5. Double-bag all ice in resealable plastic bags and seal.

5.4.1.2 Packing Samples in Coolers

The following steps will be used to pack the samples in coolers:

1. Place the chain-of-custody (COC) form in a resealable bag and tape to the underside of the cooler lid.
2. Make sure that all glass sample containers are packaged in bubble wrap, secured with clear mailing tape.
3. Place samples in an upright position in the cooler.
4. Fill the void space between samples with recyclable cornstarch popcorn, double-bagged ice, or bubble wrap.
5. Place ice on top of and between the samples.
6. Fill the remaining voids with recyclable cornstarch popcorn or double-bagged ice.
7. Custody seal large plastic bag containing samples and packing material.

5.4.1.3 Closing and Shipping of Cooler

Coolers will be packed with packing material surrounding the bottles to prevent breakage during transport. Ice will be sealed in plastic bags to prevent melting ice from soaking the packing material. Sample documentation will be enclosed in sealed plastic bags taped to the underside of the cooler lid. Coolers will be secured with packing tape and custody seals as described in the steps below.

1. Tape the cooler lid with strapping tape, encircling the cooler several times.
2. Place COC seals on two sides of the lid (one in front and one on the side).
3. Place "This Side Up" arrows on the sides of the cooler.

The coolers will then be delivered to the appropriate laboratory by the sampling team or by overnight courier the day of sample collection. Samples will only be shipped on Friday, if the laboratory provides assurance that analytical holding times will not be exceeded.

5.4.2 Sample Labeling

The following information will be written on each sample container label with a permanent marker and will be covered with clear plastic tape:

- Sample location number (if the contract laboratory program [CLP] sticker is used)
- Case number, if applicable
- Type of analysis requested
- Preservative used
- Date and time collected

Custody seals will be placed over the lids of each sample container. Custody seals on the VOA vials will be placed around the lid to prevent covering the septum.

Immediately following sample collection, the filled sample containers with completed labels will be sealed with custody seals, placed in plastic resealable bags, and placed in a cooler containing ice. VOA vials (three vials per sample) will be wrapped together in bubble wrap, secured with tape, and placed into labeled, plastic resealable bags. All other glass bottles will be bubble-wrapped, and placed into labeled plastic resealable bags.

The sampling will be coordinated with the Region 9 Sample Coordination Center. An analytical request form will be sent one to two weeks prior to a scheduled sampling event.

5.4.3 Sample Documentation

5.4.3.1 Field Notebooks

Bound and numbered logbooks will be used to record all sampling information. Information in the logbooks will include, at a minimum, the following:

- Name and title of the recorder, and date and time of entry
- General description of weather conditions
- Personnel involved with the activities
- Photographic log, if appropriate
- Sampling location and description
- Location of duplicate and QC samples, date and time of collection, parameters to be analyzed, sample identification (ID) numbers, blank ID numbers, whether or not split samples were collected, and if so, for whom
- Condition of well being sampled
- Record of parameter values obtained during purging

- Time of sampling
- Sample description
- Shipping addresses for laboratories
- Names of visitors, their associations, and purpose of visit
- Unusual activities such as departures from planned procedures
- References to important telephone calls

All logs will be completed, signed, and dated by the recorder. All information recorded in the logs will be written with waterproof ink. Corrections will be made by crossing out the error with a single horizontal line, initialing the correction, and entering the correct information. Crossed-out information must be readable.

5.4.3.2 Chain-of-Custody Forms

Chain-of-custody procedures will be used to maintain and document sample collection and possession. After sample packaging, the following one or more of the COC paperwork forms will be completed, as necessary, for the appropriate samples:

- Organic traffic report and chain-of-custody record
- Inorganic traffic report and chain-of-custody record
- EPA Region IX Chain-of-Custody Record
- Overnight shipping courier air bill

Copies of the above forms will be filled out and distributed per instructions for sample shipping and documentation in Appendix B. Completed field quality assurance/quality control summary forms will be sent to the RSCC at EPA's Region IX Quality Assurance Office (QAO) at the conclusion of each sampling event.

5.5 Quality Control Samples

The QC samples will be collected or prepared to assist in determining data reliability. These QC samples include field duplicates, field blanks, and laboratory QC samples (for MS and MSDs). The QC samples are normally collected from locations that are suspected to be of moderate contamination. The QC samples will be collected by CDM immediately following, and using the same procedures as, the collection of the target sample. CH2M HILL will collect split samples of approximately 10 percent of the QC samples (field duplicates and field blanks) collected by CDM. CH2M HILL will collect trip blanks as QC samples for the oversight effort.

5.5.1 Field Blanks

The field blanks are collected to verify that contamination is not introduced to samples during collection, handling, or shipping of the samples. They will be prepared by CDM by pouring blank water directly into the sample bottles (true field blanks) or by pouring blank water over or through decontaminated sampling equipment (equipment blanks). Commercially prepared high pressure liquid chromatography (HPLC) water will be used for organic analyses and reagent-grade deionized water for inorganic analyses using the

same preservation methods and packaging and sealing procedures used during collection of groundwater samples. Field blanks will be prepared and labeled in the same manner as the field samples and sent "blind" to the laboratory.

5.5.2 Laboratory QC Samples

Laboratory QC samples will be collected by CDM to perform MS and MSD analyses. An MS is an aliquot of a sample spiked with a known concentration of target analytes and provides a measure of the method accuracy. The MSD is a laboratory split sample of the MS, and is used to determine the precision of the method.

Twice the normal water volume will be collected for laboratory QC samples. Laboratory QC samples will be labeled as such on sample bottles and paperwork.

5.5.3 Trip Blanks

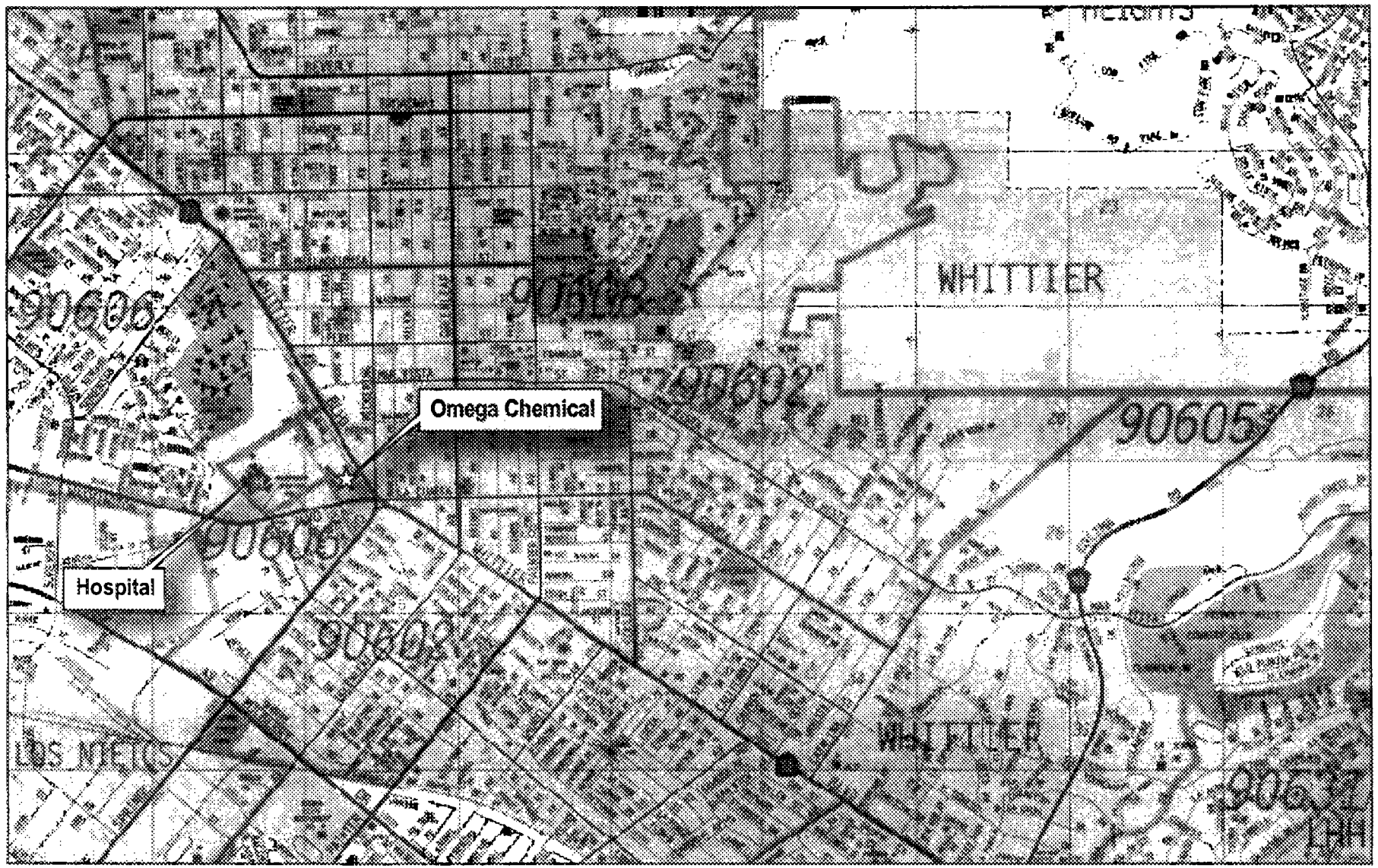
Trip blanks are used to assess the potential introduction of contaminants from sample containers or during the transportation and storage procedures. A trip blank consists of a VOC sample vial filled in the laboratory with HPLC-grade water, transported to the sampling site, handled like an environmental sample, and returned to the laboratory for analysis. Trip blanks are not opened in the field, are prepared only when VOC samples are collected, and analyzed only for VOCs.

5.5.4 Temperature Blanks

Temperature blanks will be included with each cooler shipment containing samples (regardless of targeted analysis) sent to the laboratory. A temperature blank consists of a VOC sample vial filled in the field with de-ionized water, handled like an environmental sample, and returned to the laboratory for analysis. The temperature blank provides a means of verifying that samples have been maintained at the proper temperature (4 °C) following collection and during transport to the laboratory.

Section 6
Health and Safety Plan

The Health and Safety Plan for the activities described in this SAP is provided in Appendix C. A hospital location map is provided as Figure 6-1.



Source: Thomas Guide, Los Angeles and Orange Counties, 2003

Figure 6-1
Hospital Route Map
Omega Chemical Superfund Site
12504 E. Whittier Boulevard
Whittier, California

CH2MHILL

E102003007SCO183120.PP.02 hosptal.ai 10/03

Section 7
References

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Appendix A
Target Compound Lists and Reporting Limits

Appendix A
Target Compound List and Reporting Limits
Volatile Organic Compounds

Analyte	USEPA Method 8260 Soil Samples		USEPA Method T0-14 Soil Gas and Air Samples
	Reporting Limit[1] (mg/kg)	PRG[2] (mg/kg)	Reporting Limit[1] (ppb (v/v))
Acetone	0.010	1,444	10
Benzene	0.002	0.62	2.0
Bromobenzene	0.005	28.1	NT
Bromochloromethane	0.0005	—	NT
Bromodichloromethane	0.002	0.98	2.0
Bromoform	0.005	56.2	2.0
Bromomethane	0.005	3.84	2.0
n-Butylbenzene	0.005	134	NT
sec-Butylbenzene	0.005	105	NT
tert-Butylbenzene	0.005	122	NT
Carbon tetrachloride	0.005	0.23	2.0
Chlorobenzene	0.002	53.8	2.0
Chloroethane	0.005	1,600	4.0
Chloroform	0.002	0.24	2.0
Chloromethane	0.005	1.21	4.0
2-Chlorotoluene	0.005	152	NT
4-Chlorotoluene	0.005	—	NT
Dibromochloromethane	0.002	5.28	2.0
1,2-Dibromo-3-chloropropane	0.005	0.32	NT
1,2-Dibromoethane	0.002	0.0049	2.0
Dibromomethane	0.002	545	NT
1,2-Dichlorobenzene	0.002	370	2.0
1,3-Dichlorobenzene	0.002	40.6	NT
1,4-Dichlorobenzene	0.002	3.03	2.0
Dichlorodifluoromethane (Freon 12)	0.005	93.6	2.0
1,1-Dichloroethane	0.002	571	2.0
1,2-Dichloroethane	0.002	0.34	2.0
1,1-Dichloroethene	0.005	0.052	2.0
cis-1,2-Dichloroethene	0.002	41.9	2.0
trans-1,2-Dichloroethene	0.002	62.1	2.0
1,2-Dichloropropane	0.002	0.34	2.0
1,3-Dichloropropane	0.002	—	NT
2,2-Dichloropropane	0.002	—	NT
1,1-Dichloropropene	0.002	—	NT
cis-1,3-Dichloropropene	0.002	0.081	2.0
trans-1,3-Dichloropropene	0.002	0.081	2.0

Appendix A
Target Compound List and Reporting Limits
Volatile Organic Compounds

Analyte	USEPA Method 8260 Soil Samples		USEPA Method T0-14 Soil Gas and Air Samples
	Reporting Limit[1] (mg/kg)	PRG[2] (mg/kg)	Reporting Limit[1] (ppb (v/v))
Ethylbenzene	0.002	230	2.0
Hexachlorobutadiene	0.005	5.69	4.0
Isopropylbenzene	0.002	156	NT
p-Isopropyltoluene	0.002	—	NT
Methylene chloride	0.020	8.49	2.0
Methyl tert-butyl ether	0.005	—	NT
Naphthalene	0.005	54.8	NT
n-Propylbenzene	0.002	134	NT
Styrene	0.002	1,700	2.0
1,1,1,2-Tetrachloroethane	0.005	2.85	NT
1,1,2,2-Tetrachloroethane	0.002	0.36	2.0
Tetrachloroethene	0.002	4.72	2.0
Toluene	0.002	520	2.0
1,2,3-Trichlorobenzene	0.005	—	NT
1,2,4-Trichlorobenzene	0.005	475	20
1,1,1-Trichloroethane	0.002	685	2.0
1,1,2-Trichloroethane	0.002	0.815	2.0
Trichloroethene	0.002	2.71	2.0
Trichlorofluoromethane (Freon 11)	0.005	383	2.0
1,2,3-Trichloropropane	0.010	0.0014	NT
Trichlorotrifluoroethane (Freon 113)	0.005	5,600	2.0
1,2,4-Trimethylbenzene	0.002	51.3	2.0
1,3,5-Trimethylbenzene	0.002	21.2	2.0
Vinyl chloride	0.005	0.021	2.0
o-Xylene	0.002	210	2.0
m,p-Xylenes	0.002	280	2.0

Notes:

[1] Reporting Limits (RLs) shown are for samples that have not been diluted. RLs are matrix dependent and may be higher or lower than listed.

[2] EPA Region IX Preliminary Remediation Goals (PRGs) for residential soils

\# Total Trihalomethanes

— No standard

NT Not a target analyte

Appendix A
Target Compound List and Reporting Limits
CAM Metals in Soils

Analyte	USEPA Method 6010B/6202/7471A Soil Samples	
	Reporting Limit[1] (mg/kg)	PRG[2] (mg/kg)
Antimony	10.0	31
Arsenic – Method 6020	0.5	0.39
Barium	1.0	5,375
Beryllium	1.0	154
Cadmium	0.50	37
Chromium	20	100,000
Cobalt	10.0	4,692
Copper	2.0	2,905
Lead	10.0	400
Mercury – Method 7471A	0.10	23
Molybdenum	3.0	391
Nickel	2.0	1,564
Selenium	3.0	391
Silver	1.0	391
Thallium	6.0	5.2
Vanadium	1.0	547
Zinc	1.0	23,463

Notes:

[1] Reporting Limits (RLs) are assumed to be for USEPA Method 6010B unless indicated differently beside the analyte. RLs shown are for samples that have not been diluted. RLs are matrix dependent and may be higher or lower than listed.

[2] EPA Region IX Preliminary Remediation Goals (PRGs) for residential soils

— No standard

Appendix A
Target Compound List and Reporting Limits
Semi-Volatile Organic Compounds in Soils

Analyte	USEPA Method 8270C Soil Samples	
	Reporting Limit[1] (mg/kg)	PRG[2] (mg/kg)
SVOCs: Base/Neutral Extractables		
1,2,4-Trichlorobenzene	0.7	646
1,2-Dichlorobenzene	0.7	370
1,3-Dichlorobenzene	0.7	13
1,4-Dichlorobenzene	0.7	3.4
2,4-Dinitrotoluene	0.7	0.71
2,6-Dinitrotoluene	0.7	0.71
2-Chloronaphthalene	0.7	3,852
2-Methylnaphthalene	0.7	—
2-Nitroaniline	3.3	3.5
3-Nitroaniline	3.3	—
3,3'-Dichlorobenzidine	1.3	1.1
4-Bromophenyl phenyl ether	0.7	—
4-Chloroaniline	1.3	244
4-Chlorophenyl phenyl ether	0.7	—
4-Nitroaniline	3.3	—
Acenaphthylene	0.7	3,681
Acenapthene	0.7	3,681
Anthracene	0.7	21,896
Benz(a)anthracene	0.7	0.62
Benzo(a)pyrene	0.7	0.062
Benzo(b)fluoranthene	0.7	0.62
Benzo(g,h,I)perylene	0.7	—
Benzyl alcohol	1.3	18,330
Bis(2-chloroethoxy)methane	0.7	—
Bis(2-chlorethyl)ether	0.7	0.21
Bis(2-chloroisopropyl)ether	0.7	2.9
Bis(2-ethylhexyl)phthalate	0.7	35
Butyl benzylphthalate	0.7	12,220
Chrysene	0.7	62
Di-n-butylphthalate	0.7	6,110
Di-n-octylphthalate	0.7	1,222
Dibenz(a,h)anthracene	0.7	0.062
Dibenzofuran	0.7	290
Diethyl phthalate	0.7	48,882
Dimethyl phthalate	0.7	100,000
Fluoranthene	0.7	2,293

Appendix A
Target Compound List and Reporting Limits
Semi-Volatile Organic Compounds in Soils

Analyte	USEPA Method 8270C Soil Samples	
	Reporting Limit[1] (mg/kg)	PRG[2] (mg/kg)
Fluorene	0.7	2,643
Hexachlorobenzene	0.7	0.30
Hexachlorobutadiene	0.7	6.2
Hexachlorocyclopentadiene	0.7	423
Hexachloroethane	0.7	35
Indeno)1,2,3-cd)pyrene	0.7	0.62
Isophorone	0.7	511
n-Nitrosodiphenylamine	0.7	99
n-Nitrosodi-n-propylamine	0.7	0.069
Naphthalene	0.7	56
Nitrobenzene	0.7	20
Phenanthrene	0.7	—
Pyrene	0.7	2,308
SVOCs: Acid Extractables		
2,4,5-Trichlorophenol	3.3	6,110
2,4,6-Trichlorophenol	0.3	44
2,4-Dichlorophenol	0.3	183
2,4-Dimethylphenol	0.3	1,222
2,4-Dinitrophenol	3.3	122
2-Chlorophenol	0.3	63
2-Methylphenol	0.3	3,055
2-Nitrophenol	0.3	—
4,6-Dinitro-2-methylphenol	3.3	—
4-Chloro-3-methylphenol	1.3	—
4-Methylphenol	0.3	305
4-Nitrophenol	1.6	488
Benzoic Acid	1.6	100,000
Pentachlorophenol	3.3	3.0
Phenol	0.3	36,661

Notes:

[1] Reporting Limits (RLs) shown are for samples that have not been diluted. RLs are matrix dependent and may be higher or lower than listed.

[2] EPA Region IX Preliminary Remediation Goals (PRGs) for residential soils

— No standard

Appendix A
Target Compound List and Reporting Limits
Pesticides and Polychlorinated Biphenyls in Soils

Analyte	USEPA Method 8081A/8082 Soil Samples	
	Reporting Limit[1] (mg/kg)	PRG[2] (mg/kg)
Organochlorine Pesticides – 8081A		
α-BHC	0.019	0.09
β-BHC	0.033	0.32
δ-BHC	0.011	—
γ-BHC (Lindane)	0.020	0.44
α-Chlordane	0.015	1.6
γ-Chlordane	0.015	1.6
4,4'-DDD	0.042	2.4
4,4'-DDE	0.025	1.7
4,4'-DDT	0.036	1.7
Aldrin	0.022	0.029
Dieldrin	0.035	0.03
Endosulfan I	0.021	366
Endosulfan II	0.024	366
Endosulfan Sulfate	0.036	—
Endrin	0.036	18
Endrin Aldehyde	0.016	—
Heptachlor	0.020	0.11
Heptachlor Epoxide	0.021	0.053
Methoxychlor	0.057	305
Toxaphene	0.57	0.44
Polychlorinated Biphenyls – 8082		
PCB-1016	0.70	3.9
PCB-1221	0.70	0.22
PCB-1232	0.70	0.22
PCB-1242	0.70	0.22
PCB-1248	0.70	0.22
PCB-1254	0.70	0.22
PCB-1260	0.70	0.22

Notes:

[1] Reporting Limits (RLs) shown are for samples that have not been diluted. RLs are matrix dependent and may be higher or lower than listed.

[2] EPA Region IX Preliminary Remediation Goals (PRGs) for residential soils

— No standard

Appendix A
Target Compound List and Reporting Limits
Volatile Organic Compounds in Water

Analyte	USEPA Method 8260 Water Samples	
	Reporting Limit[1] (µg/L)	MCL[2] (µg/L)
Acetone	10	—
Benzene	0.50	1
Bromobenzene	1.0	—
Bromochloromethane	1.0	—
Bromodichloromethane	1.0	100#
Bromoform	1.0	100#
Bromomethane	1.0	—
n-Butylbenzene	1.0	—
sec-Butylbenzene	0.50	—
tert-Butylbenzene	1.0	—
Carbon tetrachloride	0.50	0.5
Chlorobenzene	1.0	70
Chloroethane	1.0	—
Chloroform	1.0	100#
Chloromethane	1.0	—
2-Chlorotoluene	1.0	—
4-Chlorotoluene	1.0	—
Dibromochloromethane	1.0	100#
1,2-Dibromo-3-chloropropane	5.0	0.2
1,2-Dibromoethane	1.0	0.05
Dibromomethane	1.0	—
1,2-Dichlorobenzene	0.50	600 [(b)]
1,3-Dichlorobenzene	1.0	—
1,4-Dichlorobenzene	1.0	5
Dichlorodifluoromethane (Freon 12)	5.0	1,000 [(a)]
1,1-Dichloroethane	0.50	5
1,2-Dichloroethane	0.50	0.5
1,1-Dichloroethene	0.50	6
cis-1,2-Dichloroethene	0.50	6
trans-1,2-Dichloroethene	0.50	10
1,2-Dichloropropane	1.0	5
1,3-Dichloropropane	1.0	—
2,2-Dichloropropane	0.50	—
1,1-Dichloropropene	1.0	—
cis-1,3-Dichloropropene	0.50	0.5
trans-1,3-Dichloropropene	0.50	0.5
Ethylbenzene	1.0	700

Appendix A
Target Compound List and Reporting Limits
Volatile Organic Compounds in Water

Analyte	USEPA Method 8260 Water Samples	
	Reporting Limit[1] (µg/L)	MCL[2] (µg/L)
Hexachlorobutadiene	1.0	—
Isopropylbenzene	1.0	—
p-Isopropyltoluene	1.0	—
Methylene chloride	10	5
Methyl tert-butyl ether	10	13
Naphthalene	1.0	—
n-Propylbenzene	1.0	—
Styrene	1.0	100
1,1,1,2-Tetrachloroethane	1.0	—
1,1,2,2-Tetrachloroethane	1.0	1
Tetrachloroethene	0.50	5
Toluene	0.50	150
1,2,3-Trichlorobenzene	1.0	—
1,2,4-Trichlorobenzene	1.0	70
1,1,1-Trichloroethane	0.50	200
1,1,2-Trichloroethane	0.50	5
Trichloroethene	0.50	5
Trichlorofluoromethane (Freon 11)	0.50	150
1,2,3-Trichloropropane	1.0	—
Trichlorotrifluoroethane (Freon 113)	5.0	1,200
1,2,4-Trimethylbenzene	1.0	—
1,3,5-Trimethylbenzene	1.0	—
Vinyl chloride	0.50	0.5
o-Xylene	1.0	1,750 [(b)]
m,p-Xylenes	1.0	1,750 [(b)]

Notes:

[1] Reporting Limits (RLs) shown are for samples that have not been diluted. RLs are matrix dependent and may be higher or lower than listed.

[2] California primary Maximum Contaminant Level (MCL), unless otherwise noted

\# Total Trihalomethanes

[(a)] California Action Level

[(b)] Single isomer or sum of isomers

— No standard

NT Not a target analyte

Appendix A
Target Compound List and Reporting Limits
CAM Metals in Water

Analyte	USEPA Method 6010B/6020/7470A Water Samples	
	Reporting Limit[1] (mg/L)	MCL[2] (mg/L)
Antimony	0.05	0.006
Arsenic – Method 6020	0.001	0.05
Barium	0.005	1
Beryllium	0.005	0.004
Cadmium	0.007	0.005
Chromium	0.01	0.05
Cobalt	0.006	—
Copper	0.01	1.3 (4)
Lead	0.025	0.015 (4)
Mercury – Method 7470A	0.001	0.002
Molybdemum	0.015	—
Nickel	0.01	0.1
Selenium	0.03	0.05
Silver	0.01	—
Thallium	0.08	0.002
Vanadium	0.01	0.05 (3)
Zinc	0.01	—

Notes:

[1] Reporting Limits (RLs) are assumed to be for USEPA Method 6010B unless indicated differently beside the analyte. RLs shown are for samples that have not been diluted. RLs are matrix dependent and may be higher or lower than listed..

[2] California primary Maximum Contaminant Level (MCL)

[3] California Action Level

[4] California Lead and Copper Rule

— No standard

Appendix A
Target Compound List and Reporting Limits
Semi-Volatile Organic Compounds in Water

Analyte	USEPA Method 8270C Water Samples	
	Reporting Limit[1] (µg/L)	MCL[2] (µg/L)
SVOCs: Base/Neutral Extractables		
1,2,4-Trichlorobenzene	10	70 [(a)]
1,2-Dichlorobenzene	10	600 [(a)]
1,3-Dichlorobenzene	10	5.5
1,4-Dichlorobenzene	10	5 [(a)]
2,4-Dinitrotoluene	10	73
2,6-Dinitrotoluene	10	36
2-Chloronaphthalene	10	487
2-Methylnaphthalene	10	—
2-Nitroaniline	50	2.1
3-Nitroaniline	50	—
3,3'-Dichlorobenzidine	20	0.15
4-Bromophenyl phenyl ether	10	—
4-Chloroaniline	20	146
4-Chlorophenyl phenyl ether	10	—
4-Nitroaniline	50	—
Acenaphthylene	10	—
Acenapthene	10	365
Anthracene	10	1,825
Benz(a)anthracene	10	0.09
Benzo(a)pyrene	10	0.2 [(a)]
Benzo(b)fluoranthene	10	0.09
Benzo(g,h,I)perylene	10	—
Benzyl alcohol	20	10,950
Bis(2-chloroethoxy)methane	10	—
Bis(2-chlorethyl)ether	10	0.01
Bis(2-chloroisopropyl)ether	10	0.27
Bis(2-ethylhexyl)phthalate	10	4.8
Butyl benzylphthalate	10	7,299
Chrysene	10	9.2
Di-n-butylphthalate	10	3,649
Di-n-octylphthalate	10	730
Dibenz(a,h)anthracene	10	0.009
Dibenzofuran	10	24
Diethyl phthalate	10	29,200
Dimethyl phthalate	10	364,866
Fluoranthene	10	1,459

Appendix A
Target Compound List and Reporting Limits
Semi-Volatile Organic Compounds in Water

Analyte	USEPA Method 8270C Water Samples	
	Reporting Limit[1] (µg/L)	MCL[2] (µg/L)
Fluorene	10	243
Hexachlorobenzene	10	1 [(a)]
Hexachlorobutadiene	10	0.86
Hexachlorocyclopentadiene	10	50 [(a)]
Hexachloroethane	10	4.8
Indeno)1,2,3-cd)pyrene	10	0.09
Isophorone	10	70.8
n-Nitrosodiphenylamine	10	13.7
n-Nitrosodi-n-propylamine	10	0.01
Naphthalene	10	6.2
Nitrobenzene	10	3.4
Phenanthrene	10	—
Pyrene	10	182
SVOCs, Acid Extractables		
2,4,5-Trichlorophenol	50	3,650
2,4,6-Trichlorophenol	10	6.1
2,4-Dichlorophenol	10	110
2,4-Dimethylphenol	10	730
2,4-Dinitrophenol	50	73
2-Chlorophenol	10	30
2-Methylphenol	10	1,825
2-Nitrophenol	10	—
4,6-Dinitro-2-methylphenol	50	—
4-Chloro-3-methylphenol	20	—
4-Methylphenol	10	182
4-Nitrophenol	50	292
Benzoic Acid	50	145,978
Pentachlorophenol	50	1 [(a)]
Phenol	10	21,899

Notes:

[1] Reporting Limits (RLs) shown are for samples that have not been diluted. RLs are matrix dependent and may be higher or lower than listed.

[2] EPA Region IX Preliminary Remediation Goal for tap water

[(a)] California primary Maximum Contaminant Level (MCL)

— No standard

Appendix A
Target Compound List and Reporting Limits
Pesticides and Polychlorinated Biphenyls in Water

Analyte	USEPA Method 8081A/8082 Water Samples	
	Reporting Limit[1] (µg/L)	MCL[2] (µg/L)
Organochlorine Pesticides – 8081A		
α-BHC	0.35	0.01 [(a)]
β-BHC	0.23	0.04 [(a)]
δ-BHC	0.24	—
γ-BHC (Lindane)	0.25	0.2
α-Chlordane	0.80	0.1
γ-Chlordane	0.37	0.1
4,4'-DDD	0.50	0.28 [(a)]
4,4'-DDE	0.58	0.20 [(a)]
4,4'-DDT	0.81	0.20 [(a)]
Aldrin	0.34	0.004 [(a)]
Dieldrin	0.44	0.004 [(a)]
Endosulfan I	0.30	219 [(a)]
Endosulfan II	0.40	219 [(a)]
Endosulfan Sulfate	0.35	—
Endrin	0.39	2.0
Endrin Aldehyde	0.50	—
Heptachlor	0.40	0.01
Heptachlor Epoxide	0.32	0.01
Methoxychlor	0.86	40
Toxaphene	0.50	3.0
Polychlorinated Biphenyls – 8082		
PCB-1016	1.0	0.5
PCB-1221	1.0	0.5
PCB-1232	1.0	0.5
PCB-1242	1.0	0.5
PCB-1248	1.0	0.5
PCB-1254	1.0	0.5
PCB-1260	1.0	0.5

Notes:

[1] Reporting Limits (RLs) shown are for samples that have not been diluted. RLs are matrix dependent and may be higher or lower than listed.

[2] California primary Maximum Contaminant Level (MCL), unless otherwise noted

[(a)] EPA Region IX Preliminary Remediation Goal (PRG) for tap water

— No standard

Appendix B
Sample Shipping and Documentation Instructions

Revised Daily Sample Shipment Notification Procedure (Effective 6/1/02)
This revision supercedes all previous sample shipment notification instructions. All Friday shipments should be called into the respective points of contact by 12:00 PM Friday.

For EPA Region 9 Laboratory:

Call in shipment information to the Sample Receiving Telephone at:
(510) 412-2377

If there is a sample shipment related question or emergency, then press 0 for the Region 9 Laboratory Receptionist.

For EPA Contract Laboratory Program:

If email is available send shipping information to Rich Freitas at:
freitas.richard@epa.gov
and cc to:
brickner.carl@epa.gov
holly.rogers@dyncorp.com

or call in shipment information to Rich Freitas at:
(415) 972-3804

If Rich is out or unavailable Carl Brickner is his designated back-up and can be reached at (415) 972-3814.

For EPA Special CLP Analytical Services Laboratory Program:

If email is available send shipping information to Steve Remaley at:
remaley.steve@epa.gov

or call in shipment information to Steve Remaley at:
(415) 972-3802

Sample shipment information that is to be provided should include the following:

- Site Name
- Case Number
- Laboratory Name
- Shipping Date
- Carrier
- Airbill/Tracking Number
- Number of Coolers
- Number of Samples
- Sample Concentration
- Matrix
- Analyses
- Is the sampling event complete with this shipment or is it to continue?
- Any additional comments that may be relevant to the analyses or transportation of the samples.
- Sampler mobile phone number, if available.

EPA Region 9, and USACE Contact for Plan Review, Scheduling of Analytical Services, and Data Review

Contact	Services	Phone Number	Internet / Email Address
Region 9 Sample Coordination Center (R9RSCC)	Scheduling and Tracking of Region 9 Lab and CLP Analytical Services.	510-412-2389	R9RSCC@epa.gov
Richard Bauer	Region 9 Lab Analytical Services; Chemistry Team Leader, and RSCC Support	510-412-2389 510-412-2312	bauer.richard@epa.gov
Mary O'Donnell	Principal RSCC for Region 9 Lab and CLP Analytical Services	510-412-2389	odonnell.mary@epa.gov
Fred Cordini	Region 9 Lab Sample Receiving Custodian and RSCC Backup	510-412-2389 510-412-2323	cordini.fred@epa.gov
Greg Nagle	Region 9 Lab Field Services	510-412-2334	nagle.greg@epa.gov
Steve Remaley	Special CLP Analytical Services (Dioxins, Asbestos, etc.) and Results; CLP Technical Project Officer	(415) 972-3802	remaley.steve@epa.gov
David Taylor	Quality Assurance Plan Review Team Leader in Region 9 Quality Assurance Office	(415) 972-3803	taylor.david@epa.gov
Rose Fong	CLP Data Review and Validation Services	(415) 972-3812	fong.rose@epa.gov
Carl Brickner	Region 9 Lab Data Review and Validation Services; Data Quality Assessment	(415) 972-3814	brickner.carl@epa.gov
John Yaremchuk	QA Chemist; US Army Corps of Engineers (USACE) Coordinator for EPA Region 9 Superfund-USACE, Sacramento District Interagency Agreement (IAG) for Special Analytical Services	916-557-7504	John.W.Yaremchuk@usace.army.mil

Appendix C
Health and Safety Plan

CH2M HILL HEALTH AND SAFETY PLAN

This Health and Safety Plan (HSP) will be kept on the site during field activities and will be reviewed as necessary. The plan will be amended or revised as project activities or conditions change or when supplemental information becomes available. The plan adopts, by reference, the Standards of Practice (SOPs) in the CH2M HILL *Corporate Health and Safety Program, Program and Training Manual*, as appropriate. In addition, this plan adopts procedures in the project Work Plan. The Site Safety Coordinator (SSC) is to be familiar with these SOPs and the contents of this plan. CH2M HILL's personnel and subcontractors must sign Attachment 1.

Project Information and Description

PROJECT NO: 183120

CLIENT: EPA

PROJECT/SITE NAME: Omega Chemical

SITE ADDRESS: 12504 Whittier Blvd., Whittier, CA 90602

CH2M HILL PROJECT MANAGER: Tom Perina/SBO

CH2M HILL OFFICE: Southern California

DATE HEALTH AND SAFETY PLAN PREPARED: 10/2/2003

DATE(S) OF SITE WORK: November 2003 – Dec. 2005

SITE ACCESS: EPA to provide site access agreements

SITE SIZE: 1 acre

SITE TOPOGRAPHY: flat, paved surface, buildings, fences, on-site equipment

PREVAILING WEATHER: sunny, warm-hot

SITE DESCRIPTION AND HISTORY: The site received solvents and refrigerants for reprocessing between 1976 and 1991. Soil and groundwater contamination includes primarily perchloroethene, trichloroethene, 1,1-DCE, cis-1,2-DCE, chloroform, Freon 11, and Freon 113. The highest concentration of perchloroethene found in groundwater was 50 percent of its solubility, indicating the likely presence of non-aqueous phase in the subsurface. Depth to groundwater is approximately 70 feet below ground surface. The site lithology consists of unconsolidated interbedded fluvial sediments. Fine-grained units (silts and clays) were found in the vadose zone beneath the site. Coarser units (sands) were found at and below the water table. A soil, soil gas, and groundwater investigation has been performed by the Omega Site Potential Responsible Parties Organized Group (OPOG).

DESCRIPTION OF SPECIFIC TASKS TO BE PERFORMED: CH2M HILL will conduct oversight of Remedial Investigation/Feasibility Study (RI/FS) conducted by OPOG. The scope of the work will include review of documents, participation in meetings, oversight of field activities, collection of split/duplicate samples, and post-RI/FS support of EPA.

Site Map

Refer to Figure 6-1.

Table of Contents

1 Tasks to be Performed Under this Plan

1.1 Description of Tasks

(Reference Field Project Start-up Form)

Refer to project documents (i.e., Work Plan) for detailed task information. A health and safety risk analysis (Section 1.2) has been performed for each task and is incorporated in this plan through task-specific hazard controls and requirements for monitoring and protection. Tasks other than those listed below require an approved amendment or revision to this plan before tasks begin. Refer to Section 8.2 for procedures related to "clean" tasks that do not involve hazardous waste operations and emergency response (Hazwoper).

1.1.1 Hazwoper-Regulated Tasks

- Drilling
- Groundwater monitoring
- Surface soil sampling
- Air sampling

1.1.2 Non-Hazwoper-Regulated Tasks

Under specific circumstances, the training and medical monitoring requirements of federal or state Hazwoper regulations are not applicable. It must be demonstrated that the tasks can be performed without the possibility of exposure in order to use non-Hazwoper-trained personnel. **Prior approval from the Health and Safety Manager (HSM) is required before these tasks are conducted on regulated hazardous waste sites.**

TASKS	CONTROLS
• Engineering testing/evaluation	• Brief on hazards, limits of access, and emergency procedures • Post contaminant areas as appropriate (refer to Section 8.2 for details) • Sample and monitor as appropriate (refer to Section 5.0)

1.2 Task Hazard Analysis

(Refer to Section 2 for hazard controls)

POTENTIAL HAZARDS	TASKS		
	Drilling, geoprobe, and well installation & abandonment	Groundwater monitoring, aquifer testing	Remediation oversight
Flying debris/objects	X		X
Noise > 85dBA	X		X
Electrical	X	X	X
Suspended loads	X		X
Buried utilities, drums, tanks	X		X
Slip, trip, fall	X	X	X
Back injury	X	X	X
Confined space entry			X
Trenches / excavations			X
Visible lightning	X	X	X
Vehicle traffic			X
Elevated work areas/falls			X
Fires	X		X
Entanglement	X		
Drilling	X		
Heavy equipment	X		X
Working near water			
Working from boat			
IDW Drum Sampling			

2 Hazard Controls

This section provides safe work practices and control measures used to reduce or eliminate potential hazards. These practices and controls are to be implemented by the party in control of either the site or the particular hazard. CH2M HILL employees and subcontractors must remain aware of the hazards affecting them regardless of who is responsible for controlling the hazards. CH2M HILL employees and subcontractors who do not understand any of these provisions should contact the SSC for clarification.

In addition to the controls specified in this section, Project-Activity Self-Assessment Checklists are contained in Attachment 6. These checklists are to be used to assess the adequacy of CH2M HILL and subcontractor site-specific safety requirements. The objective of the self-assessment process is to identify gaps in project safety performance, and prompt for corrective actions in addressing these gaps. Self-assessment checklists should be completed early in the project, when tasks or conditions change, or when otherwise specified by the HSM. The self-assessment checklists, including documented corrective actions, should be made part of the permanent project records, and be promptly submitted to the HSM.

Project-specific frequency for completing self-assessments: **MONTHLY**

2.1 Project-Specific Hazards

2.1.1 Drilling

(Reference CH2M HILL SOP HS-35, *Drilling*)

- Only authorized personnel are permitted to operate drill rigs.
- Stay clear of areas surrounding drill rigs during every startup.
- Stay clear of the rotating augers and other rotating components of drill rigs.
- Stay as clear as possible of all hoisting operations. Loads shall not be hoisted overhead of personnel.
- Do not wear loose-fitting clothing or other items such as rings or watches that could get caught in moving parts. Long hair should have it restrained.
- If equipment becomes electrically energized, personnel shall be instructed not to touch any part of the equipment or attempt to touch any person who may be in contact with the electrical current. The utility company or appropriate party shall be contacted to have line de-energized prior to approaching the equipment.
- Smoking around drilling operations is prohibited.

2.1.2 Exposure to Public Vehicular Traffic

The following precautions must be taken when working around traffic, and in or near an area where traffic controls have been established by a contractor.

- Exercise caution when exiting traveled way or parking along street – avoid sudden stops, use flashers, etc.
- Park in a manner that will allow for safe exit from vehicle, and where practicable, park vehicle so that it can serve as a barrier.
- All staff working adjacent to traveled way or within work area must wear reflective/high-visibility safety vests.
- Eye protection should be worn to protect from flying debris.
- Remain aware of factors that influence traffic related hazards and required controls – sun glare, rain, wind, flash flooding, limited sight-distance, hills, curves, guardrails, width of shoulder (i.e., breakdown lane), etc.
- Always remain aware of an escape route – behind an established barrier, parked vehicle, guardrail, etc.

- Always pay attention to moving traffic – never assume drivers are looking out for you
- Work as far from traveled way as possible to avoid creating confusion for drivers.
- When workers must face away from traffic, a "buddy system" should be used, where one worker is looking towards traffic.
- When working on highway projects, obtain a copy of the contractor's traffic control plan.
- Work area should be protected by a physical barrier – such as a K-rail or Jersey barrier.
- Review traffic control devices to ensure that they are adequate to protect your work area. Traffic control devices should: 1) convey a clear meaning, 2) command respect of road users, and 3) give adequate time for proper traffic response. The adequacy of these devices are dependent on limited sight distance, proximity to ramps or intersections, restrictive width, duration of job, and traffic volume, speed, and proximity.
- Either a barrier or shadow vehicle should be positioned a considerable distance ahead of the work area. The vehicle should be equipped with a flashing arrow sign and truck-mounted crash cushion (TMCC). All vehicles within 40 feet of traffic should have an orange flashing hazard light atop the vehicle.
- Except on highways, flaggers should be used when 1) two-way traffic is reduced to using one common lane, 2) driver visibility is impaired or limited, 3) project vehicles enter or exit traffic in an unexpected manner, or 4) the use of a flagger enhances established traffic warning systems.
- Lookouts should be used when physical barriers are not available or practical. The lookout continually watches approaching traffic for signs of erratic driver behavior and warns workers. Vehicles should be parked at least 40 feet away from the work zone and traffic. Minimize the amount of time that you will have your back to oncoming traffic.

2.2 General Hazards

2.2.1 General Practices and Housekeeping

(Reference CH2M HILL SOP HS-20, *General Practices*)

- Site work should be performed during daylight hours whenever possible. Work conducted during hours of darkness require enough illumination intensity to read a newspaper without difficulty.
- Good housekeeping must be maintained at all times in all project work areas.
- Common paths of travel should be established and kept free from the accumulation of materials.
- Keep access to aisles, exits, ladders, stairways, scaffolding, and emergency equipment free from obstructions.
- Provide slip-resistant surfaces, ropes, and/or other devices to be used.
- Specific areas should be designated for the proper storage of materials.
- Tools, equipment, materials, and supplies shall be stored in an orderly manner.
- As work progresses, scrap and unessential materials must be neatly stored or removed from the work area.
- Containers should be provided for collecting trash and other debris and shall be removed at regular intervals.
- All spills shall be quickly cleaned up. Oil and grease shall be cleaned from walking and working surfaces.

2.2.2 Hazard Communication

(Reference CH2M HILL SOP HS-05, *Hazard Communication)*

The SSC is to perform the following:

- Complete an inventory of chemicals brought on site by CH2M HILL using Attachment 2.
- Confirm that an inventory of chemicals brought on site by CH2M HILL subcontractors is available.
- Request or confirm locations of Material Safety Data Sheets (MSDSs) from the client, contractors, and subcontractors for chemicals to which CH2M HILL employees potentially are exposed.
- Before or as the chemicals arrive on site, obtain an MSDS for each hazardous chemical.
- Label chemical containers with the identity of the chemical and with hazard warnings, and store properly.
- Give employees required chemical-specific HAZCOM training using Attachment 3.
- Store all materials properly, giving consideration to compatibility, quantity limits, secondary containment, fire prevention, and environmental conditions.

2.2.3 Shipping and Transportation of Chemical Products

(Reference CH2M HILL's *Procedures for Shipping and Transporting Dangerous Goods)*

Chemicals brought to the site might be defined as hazardous materials by the U.S. Department of Transportation (DOT). All staff who ship the materials or transport them by road must receive CH2M HILL training in shipping dangerous goods. All hazardous materials that are shipped (e.g., via Federal Express) or are transported by road must be properly identified, labeled, packed, and documented by trained staff. Contact the HSM or the Equipment Coordinator for additional information.

2.2.4 Lifting

(Reference CH2M HILL SOP HS-29, *Lifting*)

- Proper lifting techniques must be used when lifting any object.
  - Plan storage and staging to minimize lifting or carrying distances.
  - Split heavy loads into smaller loads.
  - Use mechanical lifting aids whenever possible.
  - Have someone assist with the lift, especially for heavy or awkward loads.
  - Make sure the path of travel is clear prior to the lift.

2.2.5 Fire Prevention

(Reference CH2M HILL SOP HS-22, *Fire Prevention*)

- Fire extinguishers shall be provided so that the travel distance from any work area to the nearest extinguisher is less than 100 feet. When 5 gallons or more of a flammable or combustible liquid is being used, an extinguisher must be within 50 feet. Extinguishers must:
  - Be maintained in a fully charged and operable condition
  - B visually inspected each month
  - Undergo a maintenance check each year
- The area in front of extinguishers must be kept clear.
- Post "Exit" signs over exiting doors, and post "Fire Extinguisher" signs over extinguisher locations.
- Combustible materials stored outside should be at least 10 feet from any building.
- Solvent waste and oily rags must be kept in a fire resistant, covered container until removed from the site.
- Flammable/combustible liquids must be kept in approved containers, and must be stored in an approved storage cabinet.

2.2.6 Electrical

(Reference CH2M HILL SOP HS-23, *Electrical*)

- Only qualified personnel are permitted to work on unprotected energized electrical systems.

- Only authorized personnel are permitted to enter high-voltage areas.
- Do not tamper with electrical wiring and equipment unless qualified to do so. All electrical wiring and equipment must be considered energized until lockout/tagout procedures are implemented.
- Inspect electrical equipment, power tools, and extension cords for damage prior to use. Do not use defective electrical equipment, remove from service.
- All temporary wiring, including extension cords and electrical power tools, must have ground fault circuit interrupters (GFCIs) installed.
- Extension cords must be:
  - Equipped with third-wire grounding.
  - Covered, elevated, or protected from damage when passing through work areas.
  - Protected from pinching if routed through doorways.
  - Not fastened with staples, hung from nails, or suspended with wire.
- Electrical power tools and equipment must be effectively grounded or double-insulated UL approved.
- Operate and maintain electric power tools and equipment according to manufacturers' instructions.
- Maintain safe clearance distances between overhead power lines and any electrical conducting material unless the power lines have been de-energized and grounded, or where insulating barriers have been installed to prevent physical contact. Maintain at least 10 feet from overhead power lines for voltages of 50 kV or less, and 10 feet plus ½ inch for every 1 kV over 50 kV.
- Temporary lights shall not be suspended by their electric cord unless designed for suspension. Lights shall be protected from accidental contact or breakage.
- Protect all electrical equipment, tools, switches, and outlets from environmental elements.

2.2.7 Stairways and Ladders

(Reference CH2M HILL SOP HS-25, *Stairways and Ladders*)

- Stairway or ladder is generally required when a break in elevation of 19 inches or greater exists.
- Personnel should avoid using both hands to carry objects while on stairways; if unavoidable, use extra precautions.
- Personnel must not use pan and skeleton metal stairs until permanent or temporary treads and landings are provided the full width and depth of each step and landing.
- Ladders must be inspected by a competent person for visible defects prior to each day's use. Defective ladders must be tagged and removed from service.
- Ladders must be used only for the purpose for which they were designed and shall not be loaded beyond their rated capacity.
- Only one person at a time shall climb on or work from an individual ladder.
- User must face the ladder when climbing; keep belt buckle between side rails
- Ladders shall not be moved, shifted, or extended while in use.
- User must use both hands to climb; use rope to raise and lower equipment and materials
- Straight and extension ladders must be tied off to prevent displacement
- Ladders that may be displaced by work activities or traffic must be secured or barricaded
- Portable ladders must extend at least 3 feet above landing surface
- Straight and extension ladders must be positioned at such an angle that the ladder base to the wall is one-fourth of the working length of the ladder
- Stepladders are to be used in the fully opened and locked position
- Users are not to stand on the top two steps of a stepladder; nor are users to sit on top or straddle a stepladder

- Fixed ladders ≥ 24 feet in height must be provided with fall protection devices.
- Fall protection should be considered when working from extension, straight, or fixed ladders greater than 6 feet from lower levels and both hands are needed to perform the work, or when reaching or working outside of the plane of ladder side rails.

2.2.8 Heat Stress

(Reference CH2M HILL SOP HS-09, *Heat and Cold Stress*)

- Drink 16 ounces of water before beginning work. Disposable cups and water maintained at 50°F to 60°F should be available. Under severe conditions, drink 1 to 2 cups every 20 minutes, for a total of 1 to 2 gallons per day. Do not use alcohol in place of water or other nonalcoholic fluids. Decrease your intake of coffee and caffeinated soft drinks during working hours.
- Acclimate yourself by slowly increasing workloads (e.g., do not begin with extremely demanding activities).
- Use cooling devices, such as cooling vests, to aid natural body ventilation. These devices add weight, so their use should be balanced against efficiency.
- Use mobile showers or hose-down facilities to reduce body temperature and cool protective clothing.
- Conduct field activities in the early morning or evening and rotate shifts of workers, if possible.
- Avoid direct sun whenever possible, which can decrease physical efficiency and increase the probability of heat stress. Take regular breaks in a cool, shaded area. Use a wide-brim hat or an umbrella when working under direct sun for extended periods.
- Provide adequate shelter/shade to protect personnel against radiant heat (sun, flames, hot metal).
- Maintain good hygiene standards by frequently changing clothing and showering.
- Observe one another for signs of heat stress. Persons who experience signs of heat syncope, heat rash, or heat cramps should consult the SSC/DSC to avoid progression of heat-related illness.

SYMPTOMS AND TREATMENT OF HEAT STRESS

	Heat Syncope	Heat Rash	Heat Cramps	Heat Exhaustion	Heat Stroke
Signs and Symptoms	Sluggishness or fainting while standing erect or immobile in heat.	Profuse tiny raised red blister-like vesicles on affected areas, along with prickling sensations during heat exposure.	Painful spasms in muscles used during work (arms, legs, or abdomen); onset during or after work hours.	Fatigue, nausea, headache, giddiness; skin clammy and moist; complexion pale, muddy, or flushed; may faint on standing; rapid thready pulse and low blood pressure; oral temperature normal or low	Red, hot, dry skin; dizziness; confusion; rapid breathing and pulse; high oral temperature.
Treatment	Remove to cooler area. Rest lying down. Increase fluid intake. Recovery usually is prompt and complete.	Use mild drying lotions and powders, and keep skin clean for drying skin and preventing infection.	Remove to cooler area. Rest lying down. Increase fluid intake.	Remove to cooler area. Rest lying down, with head in low position. Administer fluids by mouth. Seek medical attention.	Cool rapidly by soaking in cool– but not cold–water. Call ambulance, and get medical attention immediately!

Monitoring Heat Stress

These procedures should be considered when the ambient air temperature exceeds 70°F, the relative humidity is high (>50 percent), or when workers exhibit symptoms of heat stress.

The heart rate (HR) should be measured by the radial pulse for 30 seconds, as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 100 beats/minute, or 20 beats/minute above resting pulse. If the HR is higher, the next work period should be shortened by 33 percent, while the length of the rest period stays the same. If the pulse rate still exceeds 100 beats/minute at the beginning of the

next rest period, the work cycle should be further shortened by 33 percent. The procedure is continued until the rate is maintained below 100 beats/minute, or 20 beats/minute above resting pulse.

2.2.9 Cold Stress

(Reference CH2M HILL SOP HS-09, *Heat and Cold Stress*)

- Be aware of the symptoms of cold-related disorders, and wear proper, layered clothing for the anticipated fieldwork. Appropriate rain gear is a must in cool weather.
- Consider monitoring the work conditions and adjusting the work schedule using guidelines developed by the U.S. Army (wind-chill index) and the National Safety Council (NSC).
- Wind-Chill Index is used to estimate the combined effect of wind and low air temperatures on exposed skin. The wind-chill index does not take into account the body part that is exposed, the level of activity, or the amount or type of clothing worn. For those reasons, it should only be used as a guideline to warn workers when they are in a situation that can cause cold-related illnesses.
- NSC Guidelines for Work and Warm-Up Schedules can be used with the wind-chill index to estimate work and warm-up schedules for fieldwork. The guidelines are not absolute; workers should be monitored for symptoms of cold-related illnesses. If symptoms are not observed, the work duration can be increased.
- Persons who experience initial signs of immersion foot, frostbite, hypothermia should consult the SSC/DSC to avoid progression of cold-related illness.
- Observe one another for initial signs of cold-related disorders.
- Obtain and review weather forecast – be aware of predicted weather systems along with sudden drops in temperature, increase in winds, and precipitation.

SYMPTOMS AND TREATMENT OF COLD STRESS

	Immersion (Trench) Foot	Frostbite	Hypothermia
Signs and Symptoms	Feet discolored and painful; infection and swelling present.	Blanched, white, waxy skin, but tissue resilient; tissue cold and pale.	Shivering, apathy, sleepiness; rapid drop in body temperature; glassy stare; slow pulse; slow respiration.
Treatment	Seek medical treatment immediately.	Remove victim to a warm place. Re-warm area quickly in warm–but **not** hot–water. Have victim drink warm fluids, but **not** coffee or alcohol. Do not break blisters. Elevate the injured area, and get medical attention.	Remove victim to a warm place. Have victim drink warm fluids, but **not** coffee or alcohol. Get medical attention.

2.2.10 Compressed Gas Cylinders

- Valve caps must be in place when cylinders are transported, moved, or stored.
- Cylinder valves must be closed when cylinders are not being used and when cylinders are being moved.
- Cylinders must be secured in an upright position at all times.
- Cylinders must be shielded from welding and cutting operations and positioned to avoid being struck or knocked over; contacting electrical circuits; or exposed to extreme heat sources.
- Cylinders must be secured on a cradle, basket, or pallet when hoisted; they may not be hoisted by choker slings.

2.2.11 Procedures for Locating Buried Utilities

Local Utility Mark-Out Service

Name: Provided by CDM
Phone:

- Where available, obtain utility diagrams for the facility.
- Review locations of sanitary and storm sewers, electrical conduits, water supply lines, natural gas lines, and fuel tanks and lines.
- Review proposed locations of intrusive work with facility personnel knowledgeable of locations of utilities. Check locations against information from utility mark-out service.
- Where necessary (e.g., uncertainty about utility locations), excavation or drilling of the upper depth interval should be performed manually
- Monitor for signs of utilities during advancement of intrusive work (e.g., sudden change n advancement of auger or split spoon).
- When the client or other onsite party is responsible for determining the presence and locations of buried utilities, the SSC should confirm that arrangement.

2.3 Biological Hazards and Controls

2.3.1 Snakes

Snakes typically are found in underbrush and tall grassy areas. If you encounter a snake, stay calm and look around; there may be other snakes. Turn around and walk away on the same path you used to approach the area. If a person is bitten by a snake, wash and immobilize the injured area, keeping it lower than the heart if possible. Seek medical attention immediately. **DO NOT** apply ice, cut the wound, or apply a tourniquet. Try to identify the type of snake: note color, size, patterns, and markings.

2.3.2 Bees and Other Stinging Insects

Bee and other stinging insects may be encountered almost anywhere and may present a serious hazard, particularly to people who are allergic. Watch for and avoid nests. Keep exposed skin to a minimum. Carry a kit if you have had allergic reactions in the past, and inform the SSC and/or buddy. If a stinger is present, remove it carefully with tweezers. Wash and disinfect the wound, cover it, and apply ice. Watch for allergic reaction; seek medical attention if a reaction develops.

2.3.3 Bloodborne Pathogens

(Reference CH2M HILL SOP HS-36, *Bloodborne Pathogens*)

Exposure to bloodborne pathogens may occur when rendering first aid or CPR, or when coming into contact with landfill waste or waste streams containing potentially infectious material. Exposure controls and personal protective equipment (PPE) are required as specified in CH2M HILL SOP HS-36, *Bloodborne Pathogens*. Hepatitis B vaccination must be offered before the person participates in a task where exposure is a possibility.

2.5 Contaminants of Concern

(Refer to Project Files for more detailed contaminant information)

Contaminant	Location and Maximum[a] Concentration (ppm)	Exposure Limit[b]	IDLH[c]	Symptoms and Effects of Exposure	PIP[d] (eV)
Acetone	SS: 34 mg/kg	750 ppm	2,500	Irritation of the eyes, nose and throat, headache, dizziness, CNS depression, dermatitis	9.69
Cis-1,2-Dichloroethene	GW:500 µg/L	200 ppm	1000 Ca	Irritation of the eyes and respiratory system, and CNS depression	9.65
Chloroform	GW: 3,200 µg/L	2 ppm	500 Ca	Dizziness, mental dullness, nausea, confusion, disorientation, headache, fatigue, eye and skin irritation, anesthesia, enlarged liver	11.42
Chromium (total)	GW: ~50 µg/L SB: 210 mg/kg	0.5 mg/m^3	250 Ca	Irritation of the eyes and skin, lung fibrosis	NA
Methylene Chloride	SS: 100 mg/kg	25 ppm	2,300	Irritation of the eyes, skin, fatigue, weakness, light headedness, numbness and tingling in limbs, nausea, carcinogen	11.32
Trichlorotrifluoromethane (Freon 113)	Soil Gas 130,000 ppb (v/v)	1000 ppm	2000 ppm	Irritation to skin, throat, drowsiness; dermatitis, CNS depressant/depression	11.99
Trichlorofluoromethane (Freon 11)	Soil Gas 72,000 ppb (v/v)	1000 ppm	2000 ppm	Incoordination, tremor; dermatitis; irregular heart beat, cardiac arrest, asphyxia	11.77
1,1,1-Trichloroethane (1,1,1-TCA)	Soil Gas 190,000 ppb (v/v)	350 ppm	700	Eye and skin irritation, CNS depression, headache, poor equilibrium, dermatitis, irregular heart beat, liver damage	11.0
Tetrachloroethylene (PCE)	GW:81,000 µg/L2 SB:3300 µg/kg	25 ppm	150 Ca	Eye, nose, and throat irritation; nausea; flushed face and neck; vertigo; dizziness; sleepiness; skin redness; headache; liver damage	9.32
Trichloroethylene (TCE)	GW:3,400 µg/L SB:140 µg/kg	25 ppm	1,000 Ca	Headache, vertigo, visual disturbance, eye and skin irritation, fatigue, giddiness, tremors, sleepiness, nausea, vomiting, dermatitis, cardiac arrhythmia, paresthesia, liver injury	9.45
1,1-Dichloroethene	GW: 3,600 µg/L SB:60 99999µg/kg	1 ppm	N.D.	Irritation of the eyes, skin, throat; dizziness; headache, nausea, liver and kidney dysfunction, carcinogen	10.00
Chromium (hexavalent)	GW: traces	0.05 mg/m^3	15 Ca	Irritated respiratory system, nasal septum perforation, liver and kidney damage, leucytosis, leupen, monocytosis, eosinophilla, eye injury, conjunctivitis, skin ulcer, sensitization dermatitis	NA

Footnotes:

[a] Specify sample-designation and media: SB (Soil Boring), A (Air), D (Drums), GW (Groundwater), L (Lagoon), TK (Tank), S (Surface Soil), SL (Sludge), SW (Surface Water).

[b] Appropriate value of PEL, REL, or TLV listed.

[c] IDLH = immediately dangerous to life and health (units are the same as specified "Exposure Limit" units for that contaminant); NL = No limit found in reference materials; CA = Potential occupational carcinogen.

[d] PIP = photoionization potential; NA = Not applicable; UK = Unknown.

2.6 Potential Routes of Exposure

Dermal: Contact with contaminated media. This route of exposure is minimized through proper use of PPE, as specified in Section 4.	**Inhalation:** Vapors and contaminated particulates. This route of exposure is minimized through proper respiratory protection and monitoring, as specified in Sections 4 and 5, respectively.	**Other:** Inadvertent ingestion of contaminated media. This route should not present a concern if good hygiene practices are followed (e.g., wash hands and face before drinking or smoking).

3 Project Organization and Personnel

3.1 CH2M HILL Employee Medical Surveillance and Training

(Reference CH2M HILL SOPs HS-01, *Medical Surveillance*, and HS-02, *Health and Safety Training)*

The employees listed below are enrolled in the CH2M HILL Comprehensive Health and Safety Program and meet state and federal hazardous waste operations requirements for 40-hour initial training, 3-day on-the-job experience, and 8-hour annual refresher training. Employees designated "SSC" have completed a 12-hour site safety coordinator course, and have documented requisite field experience. An SSC with a level designation (D, C, B) equal to or greater than the level of protection being used must be present during all tasks performed in exclusion or decontamination zones. Employees designated "FA-CPR" are currently certified by the American Red Cross, or equivalent, in first aid and CPR. At least one FA-CPR designated employee must be present during all tasks performed in exclusion or decontamination zones. The employees listed below are currently active in a medical surveillance program that meets state and federal regulatory requirements for hazardous waste operations. Certain tasks (e.g., confined-space entry) and contaminants (e.g., lead) may require additional training and medical monitoring.

Pregnant employees are to be informed of and are to follow the procedures in CH2M HILL's SOP HS-04, *Reproduction Protection*, including obtaining a physician's statement of the employee's ability to perform hazardous activities before being assigned fieldwork.

Employee Name	Office	Responsibility	SSC/FA-CPR
Tom Perina	SBO	Project Manager	Level D
Justin Zumbro	SCO	Task Manager, SSC	Level D
Amanda Berens	SCO	Team member	Level C, FA/CPR, SSC
Benjamin Lechler	SCO	Team member	Level D, FA/CPR

3.2 Field Team Chain of Command and Communication Procedures

3.2.1 Client

Contact Name: Christopher Lichens, EPA Mgr.
Phone: 415/972-3149
Facility Contact Name: 3 tenants at location
Refrigerant Exchange Corp., Dennis O'Meara
Start City Autobody, George S. 562/698-2161
C&I Electric, Virginia Parker, 562/698-6911

3.2.2 CH2M HILL

Project Manager: Tom Perina/SBO
Health and Safety Manager: Rick Cavil/SJC
Field Team Leader: Justin Zumbro/SCO
Site Safety Coordinator: Justin Zumbro/SCO
The SSC is responsible for contacting the Field Team Leader and Project Manager. In general, the Project Manager will contact the client. The Health and Safety Manager should be contacted as appropriate.

3.2.3 CH2M HILL Subcontractors

(Reference CH2M HILL SOP HS-55, *Subcontractor, Contractor, and Owner*)

None

3.2.4 Contractors

(Reference CH2M HILL SOP HS-55, *Subcontractor, Contractor, and Owner*)

Contractor: CDM
Contractor Contact Name: Sharon Wallin
Telephone: 949/752-5452

This plan does not cover contractors that are contracted directly to the client or the owner. CH2M HILL is not responsible for the health and safety or means and methods of the contractor's work, and we must never assume such responsibility through our actions (e.g., advising on H&S issues). In addition to this plan, CH2M HILL staff should review contractor safety plans so that we remain aware of appropriate precautions that apply to us. Except in unusual situations when conducted by the HSM, CH2M HILL must never comment on or approve contractor safety procedures. Self-assessment checklists contained in Attachment 6 are to be used by the SSC to review the contractor's performance ONLY as it pertains to evaluating our exposure and safety.

Health and safety related communications with contractors should be conducted as follows:

- Request the contractor to brief CH2M HILL employees and subcontractors on the precautions related to the contractor's work.
- When an apparent contractor non-compliance/unsafe condition or practice poses a risk to CH2M HILL employees or subcontractors:
  - Notify the contractor safety representative
  - Request that the contractor determine and implement corrective actions
  - If needed, stop affected CH2M HILL work until contractor corrects the condition or practice. Notify the client, Project Manager, and HSM as appropriate.
- If apparent contractor non-compliance/unsafe conditions or practices are observed, inform the contractor safety representative. Our obligation is limited strictly to informing the contractor of our observation – the contractor is solely responsible for determining and implementing necessary controls and corrective actions.
- If an apparent imminent danger is observed, immediately warn the contractor employee(s) in danger and notify the contractor safety representative. Our obligation is limited strictly to immediately warning the affected individual(s) and informing the contractor of our observation – the contractor is solely responsible for determining and implementing necessary controls and corrective actions.
- Document all oral health and safety related communications in project field logbook, daily reports, or other records.

4 Personal Protective Equipment (PPE)

(Reference CH2M HILL SOP HS-07, *Personal Protective Equipment*, HS-08, *Respiratory Protection*)

PPE Specifications [a]

Task	Level	Body	Head	Respirator [b]
General site entry Oversight of RI/FS	D	Work clothes; steel-toe, leather work boots; reflective vest; work glove.	Hardhat [c] Safety glasses Ear protection [d]	None required
Surface water sampling Aquifer testing Sediment sampling Surface soil sampling Geoprobe boring	Modified D	Work clothes or cotton coveralls **Boots:** Steel-toe, chemical-resistant boots OR steel-toe, leather work boots with outer rubber boot covers **Gloves:** Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat [c] Safety glasses Ear protection [d]	None required
Groundwater sampling Soil boring	Modified D	**Coveralls:** Uncoated Tyvek® **Boots:** Steel-toe, chemical-resistant boots OR steel-toe, leather work boots with outer rubber boot covers **Gloves:** Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat [c] Splash shield [c] Safety glasses Ear protection [d]	None required.
Test pit excavation Tasks requiring upgrade	C	**Coveralls:** Polycoated Tyvek® **Boots:** Steel-toe, chemical-resistant boots OR steel-toe, leather work boots with outer rubber boot covers **Gloves:** Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat [c] Splash shield [c] Ear protection [d] Spectacle inserts	APR, full face, MSA Ultratwin or equivalent; with GME-H cartridges or equivalent[e].
Tasks requiring upgrade	B	**Coveralls:** Polycoated Tyvek® **Boots:** Steel-toe, chemical-resistant boots OR steel-toe, leather work boots with outer rubber boot covers **Gloves:** Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat [c] Splash shield [c] Ear protection [d] Spectacle inserts	Positive-pressure demand self-contained breathing apparatus (SCBA); MSA Ultralite, or equivalent.

Reasons for Upgrading or Downgrading Level of Protection

Upgrade[f]	Downgrade
• Request from individual performing tasks. • Change in work tasks that will increase contact or potential contact with hazardous materials. • Occurrence or likely occurrence of gas or vapor emission. • Known or suspected presence of dermal hazards. • Instrument action levels (Section 5) exceeded.	• New information indicating that situation is less hazardous than originally thought. • Change in site conditions that decreases the hazard. • Change in work task that will reduce contact with hazardous materials.

[a] Modifications are as indicated. CH2M HILL will provide PPE only to CH2M HILL employees.

[b] No facial hair that would interfere with respirator fit is permitted.

[c] Hardhat and splash-shield areas are to be determined by the SSC.

[d] Ear protection should be worn when conversations cannot be held at distances of 3 feet or less without shouting.

[e] Cartridge change-out schedule is at least every 8 hours (or one work day), except if relative humidity is > 85%, or if organic vapor measurements are > midpoint of Level C range (refer to Section 5)--then at least every 4 hours. If encountered conditions are different than those anticipated in this HSP, contact the HSM.

[f] Performing a task that requires an upgrade to a higher level of protection (e.g., Level D to Level C) is permitted only when the PPE requirements have been approved by the HSM, and an SSC qualified at that level is present.

5 Air Monitoring/Sampling

(Reference CH2M HILL SOP HS-06, *Air Monitoring)*

5.1 Air Monitoring Specifications

Instrument	Tasks	Action Levels[a]		Frequency[b]	Calibration
PID: OVM with 11.7eV lamp or equivalent	During sampling tasks	<2 ppm >2 ppm >10 ppm	Level D Level C Stop work, contact HSM	Initially and periodically during task	Daily
CGI: MSA model 260 or 261 or equivalent	During sampling tasks	0-10% : 10-25% LEL: >25% LEL:	No explosion hazard Potential explosion hazard Explosion hazard; evacuate or vent	Continuous during advancement of boring or trench	Daily

[a] Action levels apply to sustained breathing-zone measurements above background.

[b] The exact frequency of monitoring depends on field conditions and is to be determined by the SSC; generally, every 5 to 15 minutes if acceptable; more frequently may be appropriate. Monitoring results should be recorded. Documentation should include instrument and calibration information, time, measurement results, personnel monitored, and place/location where measurement is taken (e.g., "Breathing Zone/MW-3", "at surface/SB-2", etc.).

[c] If the measured percent of O_2 is less than 10, an accurate LEL reading will not be obtained. Percent LEL and percent O_2 action levels apply only to ambient working atmospheres, and not to confined-space entry. More-stringent percent LEL and O_2 action levels are required for confined-space entry (refer to Section 2).

[d] Refer to SOP HS-10 for instructions and documentation on radiation monitoring and screening.

[e] Noise monitoring and audiometric testing also required.

5.2 Calibration Specifications

(Refer to the respective manufacturer's instructions for proper instrument-maintenance procedures)

Instrument	Gas	Span	Reading	Method
PID: OVM, 10.6 or 11.8 eV bulb	100 ppm isobutylene	RF = 1.0	100 ppm	1.5 lpm reg T-tubing
PID: MiniRAE, 10.6 eV bulb	100 ppm isobutylene	CF = 100	100 ppm	1.5 lpm reg T-tubing
PID: TVA 1000	100 ppm isobutylene	CF = 1.0	100 ppm	1.5 lpm reg T-tubing
FID: OVA	100 ppm methane	3.0 ± 1.5	100 ppm	1.5 lpm reg T-tubing
FID: TVA 1000	100 ppm methane	NA	100 ppm	2.5 lpm reg T-tubing
Dust Monitor: Miniram-PDM3	Dust-free air	Not applicable	0.00 mg/m^3 in "Measure" mode	Dust-free area OR Z-bag with HEPA filter
CGI: MSA 260, 261, 360, or 361	0.75% pentane	N/A	50% LEL ± 5% LEL	1.5 lpm reg direct tubing

6 Decontamination

(Reference CH2M HILL SOP HS-13, *Decontamination*)

The SSC must establish and monitor the decontamination procedures and their effectiveness. Decontamination procedures found to be ineffective will be modified by the SSC. The SSC must ensure that procedures are established for disposing of materials generated on the site.

6.1 Decontamination Specifications

Personnel

- Boot wash/rinse
- Glove wash/rinse
- Outer-glove removal
- Body-suit removal
- Inner-glove removal
- Respirator removal
- Hand wash/rinse
- Face wash/rinse
- Shower ASAP
- Dispose of PPE in municipal trash, or contain for disposal
- Dispose of personnel rinse water to facility or sanitary sewer, or contain for offsite disposal

Sample Equipment

- Wash/rinse equipment
- Solvent-rinse equipment
- Contain solvent waste for offsite disposal

Heavy Equipment

- Power wash
- Steam clean
- Dispose of equipment rinse water to facility or sanitary sewer, or contain for offsite disposal

6.2 Diagram of Personnel-Decontamination Line

No eating, drinking, or smoking is permitted in contaminated areas and in exclusion or decontamination zones. The SSC should establish areas for eating, drinking, and smoking. Contact lenses are not permitted in exclusion or decontamination zones.

Figure 6-1 illustrates a conceptual establishment of work zones, including the decontamination line. Work zones are to be modified by the SSC to accommodate task-specific requirements.

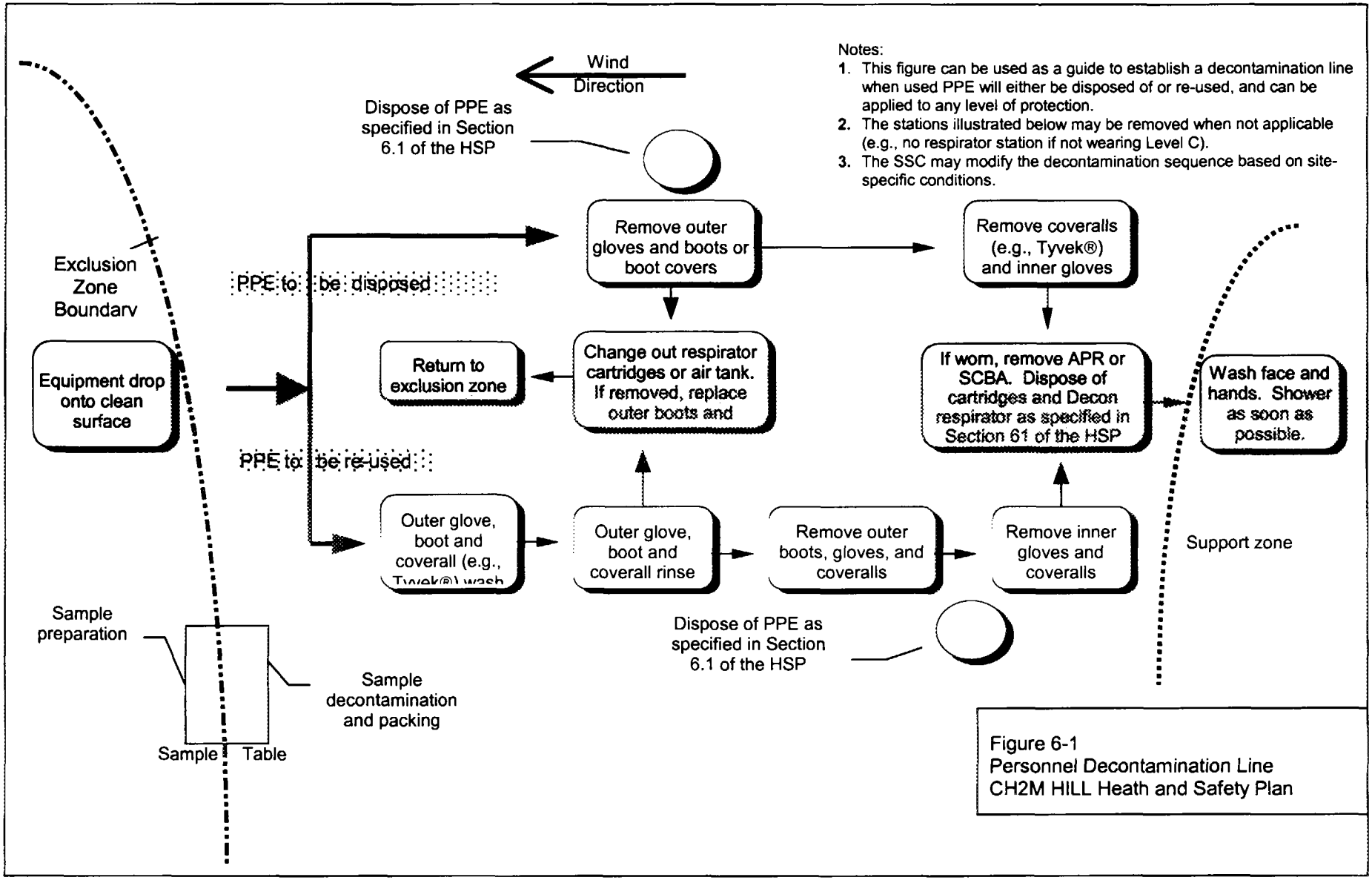

Figure 6-1
Personnel Decontamination Line
CH2M HILL Heath and Safety Plan

7 Spill-Containment Procedures

Sorbent material will be maintained in the support zone. Incidental spills will be contained with sorbent and disposed of properly.

8 Site-Control Plan

8.1 Site-Control Procedures

(Reference CH2M HILL SOP HS-11, *Site Control)*

- The SSC will conduct a site safety briefing (see below) before starting field activities or as tasks and site conditions change.
- Topics for briefing on site safety: general discussion of Health and Safety Plan, site-specific hazards, locations of work zones, PPE requirements, equipment, special procedures, emergencies.
- The SSC records attendance at safety briefings in a logbook and documents the topics discussed.
- Post the OSHA job-site poster in a central and conspicuous location in accordance with CH2M HILL SOP HS-71, *OSHA Postings.*
- Establish support, decontamination, and exclusion zones. Delineate with flags or cones as appropriate. Support zone should be upwind of the site. Use access control at entry and exit from each work zone.
- Establish onsite communication consisting of the following:
  - Line-of-sight and hand signals
  - Air horn
  - Two-way radio or cellular telephone if available
- Establish offsite communication.
- Establish and maintain the "buddy system."
- Initial air monitoring is conducted by the SSC in appropriate level of protection.
- The SCC is to conduct periodic inspections of work practices to determine the effectiveness of this plan – refer to Sections 2 and 3. Deficiencies are to be noted, reported to the HSM, and corrected.

8.2 Hazwoper Compliance Plan

(Reference CH2M HILL SOP HS-19, *Site-Specific Written Safety Plans)*

Certain parts of the site work are covered by state or federal Hazwoper standards and therefore require training and medical monitoring. Anticipated Hazwoper tasks (Section 1.1.1) might occur consecutively or concurrently with respect to non-Hazwoper tasks. This section outlines procedures to be followed when approved activities specified in Section 1.1.2 do not require 24- or 40-hour training. Non-Hazwoper-trained personnel also must be trained in accordance with all other state and federal OSHA requirements.

- In many cases, air sampling, in addition to real-time monitoring, must confirm that there is no exposure to gases or vapors before non-Hazwoper-trained personnel are allowed on the site, or while non-Hazwoper-trained staff are working in proximity to Hazwoper activities. Other data (e.g., soil) also must document that there is no potential for exposure. The HSM must approve the interpretation of these data. Refer to Subsections 2.5 and 5.3 for contaminant data and air sampling requirements, respectively.
- When non-Hazwoper-trained personnel are at risk of exposure, the SSC must post the exclusion zone and inform non-Hazwoper-trained personnel of the:
  - Nature of the existing contamination and its locations
  - Limitations of their access
  - Emergency action plan for the site
- Periodic air monitoring with direct-reading instruments conducted during regulated tasks also should be used to ensure that non-Hazwoper-trained personnel (e.g., in an adjacent area) are not exposed to airborne contaminants.
- When exposure is possible, non-Hazwoper-trained personnel must be removed from the site until it can be demonstrated that there is no longer a potential for exposure to health and safety hazards.
- Remediation treatment system start-ups: Once a treatment system begins to pump and treat contaminated media, the site is, for the purposes of applying the Hazwoper standard, considered a treatment, storage, and disposal facility (TSDF). Therefore, once the system begins operation, only Hazwoper-trained personnel (minimum of 24 hour of training) will be permitted to enter the site. All non-Hazwoper-trained personnel must not enter the TSDF area of the site.

9 Emergency Response Plan

(Reference CH2M HILL, SOP HS-12, *Emergency Response*)

9.1 Pre-Emergency Planning

The SSC performs the applicable pre-emergency planning tasks before starting field activities and coordinates emergency response with CH2M HILL onsite parties, the facility, and local emergency-service providers as appropriate.

- Review the facility emergency and contingency plans where applicable.
- Determine what onsite communication equipment is available (e.g., two-way radio, air horn).
- Determine what offsite communication equipment is needed (e.g., nearest telephone, cell phone).
- Confirm and post emergency telephone numbers, evacuation routes, assembly areas, and route to hospital; communicate the information to onsite personnel.
- Field Trailers: Post "Exit" signs above exit doors, and post "Fire Extinguisher" signs above locations of extinguishers. Keep areas near exits and extinguishers clear.
- Review changed site conditions, onsite operations, and personnel availability in relation to emergency response procedures.
- Where appropriate and acceptable to the client, inform emergency room and ambulance and emergency response teams of anticipated types of site emergencies.
- Designate one vehicle as the emergency vehicle; place hospital directions and map inside; keep keys in ignition during field activities.
- Inventory and check site emergency equipment, supplies, and potable water.
- Communicate emergency procedures for personnel injury, exposures, fires, explosions, and releases.
- Rehearse the emergency response plan before site activities begin, including driving route to hospital.
- Brief new workers on the emergency response plan.

The SSC will evaluate emergency response actions and initiate appropriate follow-up actions.

9.2 Emergency Equipment and Supplies

The SSC should mark the locations of emergency equipment on the site map and post the map.

Emergency Equipment and Supplies	Location
20 LB (or two 10-lb) fire extinguisher (A, B, and C classes)	Support Zone/Heavy Equipment
First aid kit	Support Zone/Field Vehicle
Eye Wash	Support & Decon Zone/Field Vehicle
Potable water	Support & Decon Zone/Field Vehicle
Bloodborne-pathogen kit	Support Zone/Field Vehicle
Additional equipment (specify):	

9.3 Incident Response

In fires, explosions, or chemical releases, actions to be taken include the following:

- Shut down CH2M HILL operations and evacuate the immediate work area.
- Notify appropriate response personnel.
- Account for personnel at the designated assembly area(s).
- Assess the need for site evacuation, and evacuate the site as warranted.

Instead of implementing a work-area evacuation, note that small fires or spills posing minimal safety or health hazards may be controlled.

9.4 Emergency Medical Treatment

The procedures listed below may also be applied to non-emergency incidents. Injuries and illnesses (including overexposure to contaminants) must be reported to Human Resources. If there is doubt about whether medical treatment is necessary, or if the injured person is reluctant to accept medical treatment, contact the CH2M HILL medical consultant. During non-emergencies, follow these procedures as appropriate.

- Notify appropriate emergency response authorities listed in Section 9.8 (e.g., 911).
- The SCC will assume charge during a medical emergency until the ambulance arrives or until the injured person is admitted to the emergency room.
- Prevent further injury.
- Initiate first aid and CPR where feasible.
- Get medical attention immediately.
- Perform decontamination where feasible; lifesaving and first aid or medical treatment take priority.
- Make certain that the injured person is accompanied to the emergency room.
- When contacting the medical consultant, state that the situation is a CH2M HILL matter, and give your name and telephone number, the name of the injured person, the extent of the injury or exposure, and the name and location of the medical facility where the injured person was taken.
- Report incident as outlined in Section 9.7.

9.5 Evacuation

- Evacuation routes and assembly areas (and alternative routes and assembly areas) are specified on the site map.
- Evacuation route(s) and assembly area(s) will be designated by the SSC before work begins.
- Personnel will assemble at the assembly area(s) upon hearing the emergency signal for evacuation.
- The SSC and a "buddy" will remain on the site after the site has been evacuated (if safe) to assist local responders and advise them of the nature and location of the incident.
- The SSC will account for all personnel in the onsite assembly area.
- A designated person will account for personnel at alternate assembly area(s).
- The SSC will write up the incident as soon as possible after it occurs and submit a report to the Corporate Director of Health and Safety.

9.6 Evacuation Signals

Signal	Meaning
Grasping throat with hand	Emergency-help me.
Thumbs up	OK; understood.
Grasping buddy's wrist	Leave area now.
Continuous sounding of horn	Emergency; leave site now.

9.7 Incident Notification and Reporting

- Upon any project incident (fire, spill, injury, near miss, death, etc.), immediately notify the PM and HSM. Call emergency beeper number if HSM is unavailable.
- For CH2M HILL work-related injuries or illnesses, contact and help Human Resources administrator complete an Incident Report Form (IRF). IRF must be completed within 24 hours of incident.
- For CH2M HILL subcontractor incidents, complete the Subcontractor Accident/Illness Report Form and submit to the HSM.
- Notify and submit reports to client as required in contract.

10 Approval

This site-specific Health and Safety Plan has been written for use by CH2M HILL only. CH2M HILL claims no responsibility for its use by others unless that use has been specified and defined in project or contract documents. The plan is written for the specific site conditions, purposes, dates, and personnel specified and must be amended if those conditions change.

10.1 Original Plan

Written By: Rick Cavil/SJC **Date: 10/06/2003**

Approved By: Trish Danby/SAC **Date: 10/16/2003**

10.2 Revisions

Revisions Made By: **Date:**

Revisions to Plan:

Revisions Approved By: **Date:**

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11 Attachments

Attachment 1: Employee Signoff Form – Field Safety Instructions
Attachment 2: Project-Specific Chemical Product Hazard Communication Form
Attachment 3: Chemical-Specific Training Form
Attachment 4: Emergency Contacts
Attachment 5: Project Activity Self-Assessment Checklists
Attachment 6: Applicable Material Safety Data Sheets

CH2MHILL

EMPLOYEE SIGNOFF FORM

Health and Safety Plan

- The CH2M HILL project employees and subcontractors listed below have been provided with a copy of this HSP, have read and understood it, and agree to abide by its provisions.

Project Name: Omega Chemical **Project Number:** 183120

EMPLOYEE NAME (Please print)	EMPLOYEE SIGNATURE	COMPANY	DATE

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Project-Specific Chemical Product Hazard Communication Form

This form must be completed prior to performing activities that expose personnel to hazardous chemicals products. Upon completion of this form, the SSC shall verify that training is provided on the hazards associated with these chemicals and the control measures to be used to prevent exposure to CH2M HILL and subcontractor personnel. Labeling and MSDS systems will also be explained.

Project Name: Omega Chemical **Project Number:** 183120

MSDSs will be maintained at the following location(s):

Hazardous Chemical Products Inventory

Chemical	Quantity	Location	MSDS Available	Container labels	
				Identity	Hazard
Methane	1 liter, compressed	Support Zone			
Isobutylene	1 liter, compressed	Support Zone			
Pentane	1 liter, compressed	Support Zone			
Hydrochloric acid	< 500 ml	Support Zone / sample bottles			
Nitric acid	< 500 ml	Support Zone / sample bottles			
Sulfuric Acid	< 500 ml	Support Zone / sample bottles			
Sodium hydroxide	< 500 ml	Support Zone / sample bottles			
Methanol	< 1 Gallon	Support/Decon Zones			
Hexane	< 1 Gallon	Support/Decon Zones			
pH buffers	< 500 ml	Support Zone			
MSA Sanitizer	< 1 liter	Support/Decon Zones			
Alconox/Liquinox	< 1liter	Support/Decon Zones			

Refer to SOP HS-05 *Hazard Communication* for more detailed information.

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CHEMICAL-SPECIFIC TRAINING FORM

Location:	Project # : 183120
HCC:	Trainer:

TRAINING PARTICIPANTS:

NAME	SIGNATURE	NAME	SIGNATURE

REGULATED PRODUCTS/TASKS COVERED BY THIS TRAINING:

The HCC shall use the product MSDS to provide the following information concerning each of the products listed above.

☐ Physical and health hazards

☐ Control measures that can be used to provide protection (including appropriate work practices, emergency procedures, and personal protective equipment to be used)

☐ Methods and observations used to detect the presence or release of the regulated product in the workplace (including periodic monitoring, continuous monitoring devices, visual appearance or odor of regulated product when being released, etc.)

Training participants shall have the opportunity to ask questions concerning these products and, upon completion of this training, will understand the product hazards and appropriate control measures available for their protection.

Copies of MSDSs, chemical inventories, and CH2M HILL's written hazard communication program shall be made available for employee review in the facility/project hazard communication file.

Emergency Contacts

24-hour CH2M HILL Emergency Beeper – 888/444-1226

Medical Emergency – 911

CH2M HILL Medical Consultant
Health Resources
Dr. Jerry H. Berke, M.D., M.P.H.
600 West Cummings Park, Suite 3400
Woburn, MA 01801-6350
1-781-938-4653 1-800-350-4511
(After hours calls will be returned within 20 minutes)

Fire/Spill Emergency – 911

Corporate Director Health, Safety & Environment
Name: Dave McCormack/SEA
Phone: 425/453-5000
24-hour emergency beeper: 888-444-1226

Security & Police – 911

Health & Safety Manager (HSM)
Name: Rick Cavil/SJC
Phone: 408/436-4909 x429

Safety Coordinator (SC)
Name: Justin Zumbro/SCO
Phone: 714/435-6017

Regional Human Resources Department
Name: Lisa Covey/SAC
Phone: 916/920-0300 x253

Project Manager (PM)
Name: Tom Perina/SBO
Phone: 909/890-9857

Corporate Human Resources Department
Name: Pete Hannan/COR
Phone: 303/771-0900

Federal Express Dangerous Goods Shipping
Phone: 800/238-5355

CH2M HILL Emergency Number for Shipping Dangerous Goods
Phone: 800/255-3924

Worker's Compensation:
Contact Regional HR dept. to have form completed or contact Julie Zimmerman after hours: 303/664-3304

Automobile Accidents:
Rental: Carol Dietz/COR 303/713-2757
CH2M HILL-owned vehicle:
Zurich Insurance Co. 800/987-3373

Contact the PM. Generally, the PM will contact relevant government agencies.

Facility Alarms:

Evacuation Assembly Area(s):

Facility/Site Evacuation Route(s):

Hospital Name/Address: Presbyterian Medical Hospital
12401 E. Washington Blvd, Whittier, CA

Hospital Phone #: 562-696-0811

Directions to Hospital

Travel west on Washington Blvd, approx. 0.25 miles. The hospital is on the right hand (north)side of Washington Blvd.

A hospital route map is provided at the back of this HASP.

CH2M HILL HEALTH AND SAFETY PLAN

Attachment 5

Project Activity Self-Assessment Checklists

CH2MHILL

H&S Self-Assessment Checklist - DRILLING

This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project's HSP/FSI.

This checklist is to be used at locations where: 1) CH2M HILL employees are potentially exposed to hazards associated with drilling operations (complete Sections 1 and 3), and/or 2) CH2M HILL oversight of a drilling subcontractor is required (complete entire checklist).

SSC/DSC may consult with drilling subcontractors when completing this checklist, but shall not direct the means and methods of drilling operations nor direct the details of corrective actions. Drilling subcontractors shall determine how to correct deficiencies and we must carefully rely on their expertise. Items considered to be imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazard until corrected.

Completed checklists shall be sent to the health and safety manager for review.

Project Name: _____ Project No.: _____

Location: _____ PM: _____

Auditor: _____ Title: _____ Date: _____

This specific checklist has been completed to:

☐ Evaluate CH2M HILL employee exposures to drilling hazards
☐ Evaluate a CH2M HILL subcontractor's compliance with drilling H&S requirements
Subcontractors Name: _____

- Check "Yes" if an assessment item is complete/correct.
- Check "No" if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the drilling subcontractor. Section 3 must be completed for all items checked "No."
- Check "N/A" if an item is not applicable.
- Check "N/O" if an item is applicable but was not observed during the assessment.

Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HS-35.

SECTION 1	Yes	No	N/A	N/O
PERSONNEL SAFE WORK PRACTICES (3.1)				
1. Only authorized personnel operating drill rig	☐	☐	☐	☐
2. Personnel cleared during rig startup	☐	☐	☐	☐
3. Personnel clear of rotating parts	☐	☐	☐	☐
4. Personnel not positioned under hoisted loads	☐	☐	☐	☐
5. Loose clothing and jewelry removed	☐	☐	☐	☐
6. Personnel instructed not to approach equipment that has become electrically energized	☐	☐	☐	☐
7. Smoking is prohibited around drilling operation	☐	☐	☐	☐
8. Personnel wearing appropriate PPE, per HSP/FSI	☐	☐	☐	☐

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SECTION 2	Yes	No	N/A	N/O
GENERAL (3.2.1)				
9. Daily safety briefing/meeting conducted with crew	☐	☐	☐	☐
10. Daily inspection of drill rig and equipment conducted before use	☐	☐	☐	☐
DRILL RIG PLACEMENT (3.2.2)				
11. Location of underground utilities identified	☐	☐	☐	☐
12. Safe clearance distance maintained from overhead powerlines	☐	☐	☐	☐
13. Drilling pad established, when necessary	☐	☐	☐	☐
14. Drill rig leveled and stabilized	☐	☐	☐	☐
DRILL RIG TRAVEL (3.2.3)				
15. Rig shut down and mast lowered and secured prior to rig movement	☐	☐	☐	☐
16. Tools and equipment secured prior to rig movement	☐	☐	☐	☐
17. Only personnel seated in cab are riding on rig during movement	☐	☐	☐	☐
18. Safe clearance distance maintained while traveling under overhead powerlines	☐	☐	☐	☐
19. Backup alarm or spotter used when backing rig	☐	☐	☐	☐
DRILL RIG OPERATION (3.2.4)				
20. Kill switch clearly identified and operational	☐	☐	☐	☐
21. All machine guards are in place	☐	☐	☐	☐
22. Rig ropes not wrapped around body parts	☐	☐	☐	☐
23. Pressurized lines and hoses secured from whipping hazards	☐	☐	☐	☐
24. Drill operation stopped during inclement weather	☐	☐	☐	☐
25. Air monitoring conducted per HSP/FSI for hazardous atmospheres	☐	☐	☐	☐
26. Rig placed in neutral when operator not at controls	☐	☐	☐	☐
DRILL RIG MAINTENANCE (3.2.5)				
27. Defective components repaired immediately	☐	☐	☐	☐
28. Lockout/tagout procedures used prior to maintenance	☐	☐	☐	☐
29. Cathead in clean, sound condition	☐	☐	☐	☐
30. Drill rig ropes in clean, sound condition	☐	☐	☐	☐
31. Fall protection used for fall exposures of 6 feet or greater	☐	☐	☐	☐
32. Rig in neutral and augers stopped rotating before cleaning	☐	☐	☐	☐
33. Good housekeeping maintained on and around rig	☐	☐	☐	☐
DRILLING AT HAZARDOUS WASTE SITES (3.2.6)				
34. Waste disposed of according to HSP	☐	☐	☐	☐
35. Appropriate decontamination procedures being followed, per HSP	☐	☐	☐	☐

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SECTION 3

Complete this section for all items checked "No" in Sections 1 or 2. Deficient items must be corrected in a timely manner.

Item #	Corrective Action Planned/Taken	Date Corrected

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